

The Milbank Memorial Fund
QUARTERLY

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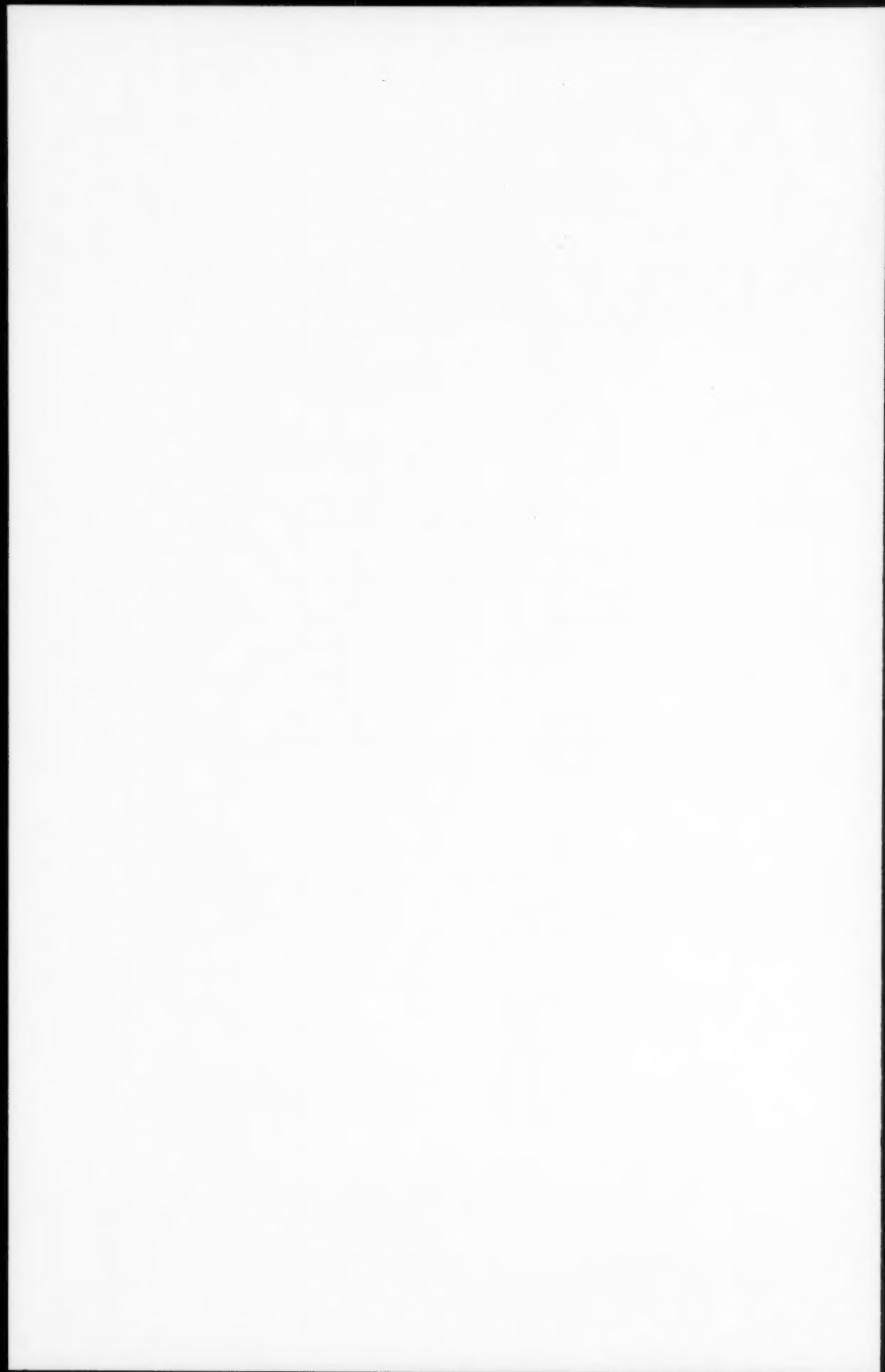
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IN THIS ISSUE

WITHIN a short period of time, such as one year, only a small percentage of the population will experience illness which will require a large amount of medical care. This has been demonstrated in many studies and is, of course, the basic reason for application of the insurance principle for meeting unpredictable high cost of medical care. There is little evidence available, however, concerning the continuing need for medical care over longer periods of time by special groups of families or individuals. Using three years of experience for families insured in the Health Insurance Plan of Greater New York, Paul M. Densen, Sam Shapiro and Marilyn Einhorn examine the question of concentration of utilization of physician services in the article entitled "Concerning High and Low Utilizers of Service in a Medical Care Plan and the Persistence of Utilization Levels Over a Three Year Period." Distribution of services in one year showed that four per cent of the insured persons accounted for one-fourth of all physician visits and twelve per cent accounted for one-half the visits. For a group of high utilizers in the first year, it was found that one-fifth of them remained high utilizers in both of the following two years, and about one-third were high utilizers in at least one of the years. Thus, a small number of persons had a very large amount of medical care during the three years. The reasons for this need further investigation.

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An association between health and social welfare problems in families is a familiar finding to professional workers in public health and social welfare. A statistical evaluation of this association is made by Zdenek Hrubec in the article entitled "The

Association of Health and Social Welfare Problems in Individuals and Their Families." Records of social agencies for families included in a community health survey provided data on social welfare problems and health status of individuals in the survey. The author is interested especially in the association of these problems within family units. His findings support the conclusion that "in addition to factors which produce a clustering of sick persons in families and factors which produce a clustering of persons with social problems in families, there are factors which affect both jointly."

• • •

The Indianapolis Study indicated that the extent of a wife's participation in activities outside the home is inversely related to her fertility and desired size of family. However, because of their *ex post facto* nature, the Indianapolis Study data do not provide much basis for separating cause and effect on this question. This weakness is diminished to some extent in Jeanne Clare Ridley's article in this issue "Number of Children Expected in Relation to Non-Familial Activities of the Wife." The data relate to number of children expected by wives 18-39 years old. They were collected in the 1955 Growth of American Families Study. This particular analysis is based upon the records for 1,794 white married women classified as fecund.

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The registration of births and deaths is characteristically a function of the State Health Departments in this country. This pattern was set in Massachusetts as described by Dr. Robert Gutman in his third article of a series: "Birth and Death Registration in Massachusetts III. The System Achieves a Form, 1849-1869." This period of twenty years was one of "many noteworthy reforms in the operation of the registration system." It was notable chiefly for the struggle between those who regarded registration of births and deaths as a health function and those who regarded it as a civil function for the Courts and the Secretary of State. The inauguration of the State Board of Health in 1869, the first in the United States "finally resolved this controversy" according to Dr. Gutman.

CONCERNING HIGH AND LOW UTILIZERS OF SERVICE IN A MEDICAL CARE PLAN, AND THE PERSISTENCE OF UTILIZATION LEVELS OVER A THREE YEAR PERIOD¹

PAUL M. DENSEN, SAM SHAPIRO AND MARILYN EINHORN²

INTRODUCTION

THE unequal distribution of episodes of illness and physical and social disability in various population groups has been the subject of intensive investigation for years. These studies have demonstrated repeatedly that small groups account for disproportionately large shares of the adverse events experienced by the population and that there is a tendency for high incidence groups to remain high for extended periods of time.

A distinguishing characteristic of inquiries in more recent years has been the application made of this type of observation to specific medical care, industrial, health and welfare problems. Thus, the uneven distribution of medical costs in the population (1) has spurred much of the interest in the extension of health insurance to all types of physician services. The concentration of the bulk of industrial absenteeism and illnesses in a minority of employees has led to questions of direct concern to management as well as to more general questions regarding the role of the social and interpersonal environment in the occurrence of these episodes. (2) In the public welfare field, the receipt by a relatively few disabled indigent families of most of the expenditures for community health and dependency services has resulted in concerted efforts to find better methods of prevention or control. (3)

Two observations of the utilization experience of members of the Health Insurance Plan of Greater New York (HIP)

¹ This study was made possible through a grant from the Health Information Foundation.

² Division of Research and Statistics, Health Insurance Plan of Greater New York.

indicate that here, too, there may be a setting for useful investigation of population behavior, this time with respect to the receipt of physician services in a prepaid group practice medical care plan.

1. Each year it is found that 4 per cent of the HIP members account for 25 per cent of the total volume of physician services and that 12 per cent account for 50 per cent of all services. This indicates an extraordinarily high degree of concentration of medical care in a small group of individuals. At the low end of the utilization scale, about 1 in 4 members receive no services in a year and another 1 in four see a doctor once or twice (Table 1, Figure 1).

2. It has also been observed in HIP that when groups of individuals are followed for several years, the average experience of a group that initially has a high utilization decreases somewhat but remains comparatively high; the average experience of an initially low utilization group increases but remains low (Figure 2).³

The preceding suggest that there are people who are *characteristically high utilizers* and that they account for a significant segment of the medical care provided to all persons. Confirmation of this would lead to further inquiry into the nature of the consistent high utilizers and eventually to an examination of

Table 1. Distribution of HIP members by number of physician visits during the year July 1, 1956-June 30, 1957.

NUMBER OF PHYSICIAN VISITS	PER CENT OF ALL HIP MEMBERS
TOTAL	100.0
No Service	25.3
1	12.8
2	10.8
3	9.0
4	7.3
5-6	10.7
7-9	9.3
10-14	7.2
15-19	3.4
20-24	1.8
25-29	0.9
30-39	0.9
40 or More	0.6

NOTE: Data based on a 10 per cent sample of HIP subscribers insured throughout the year and all of their dependents enrolled on June 30, 1957.

³ Based on the results of a longitudinal study of the experience in the first few years of HIP's program, 1948-1951. The study was carried out through grants received from the Rockefeller Foundation and the Commonwealth Fund.

issues of potential value for "medical economics" and the organization of medical practice. Briefly, the questions that would be of interest are of the following variety:

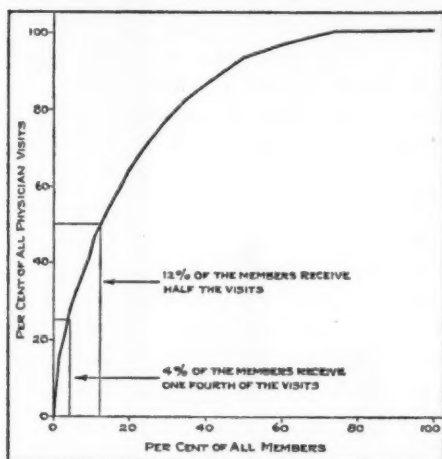


Fig. 1. Distribution of physician visits among HIP members July 1, 1956-June 30, 1957. Data based on a 10 per cent sample of HIP subscribers insured throughout the year and all of their dependents enrolled on June 30, 1957.

a. To what extent does the group of persistent high utilizers consist of the chronically ill, those subject to repeated attacks of minor illnesses, the anxious and dependent?

b. In a group practice setting such as HIP, does the high utilization pattern result, to any important degree, from a carry-over of traditional ways of providing medical care in solo practice? If so, what are the possibilities for experimenting with changes which would benefit the patient and increase efficiency in

providing medical care?

With regard to the non-utilizer group, the findings mentioned above suggest that there is a significant number of individuals who for long intervals of time feel that they do not need medical care. This group is of interest from two standpoints:

a. To what extent does it consist of individuals who ignore symptoms generally agreed upon as requiring medical attention and what does this mean for future medical requirements?⁴

b. To what extent does it consist of individuals who are free

⁴ An essential point to be clarified is the extent to which non-utilizers of HIP physicians receive medical care from physicians outside of HIP. It is believed that this is a relatively small proportion of the total number of "non-utilizers."

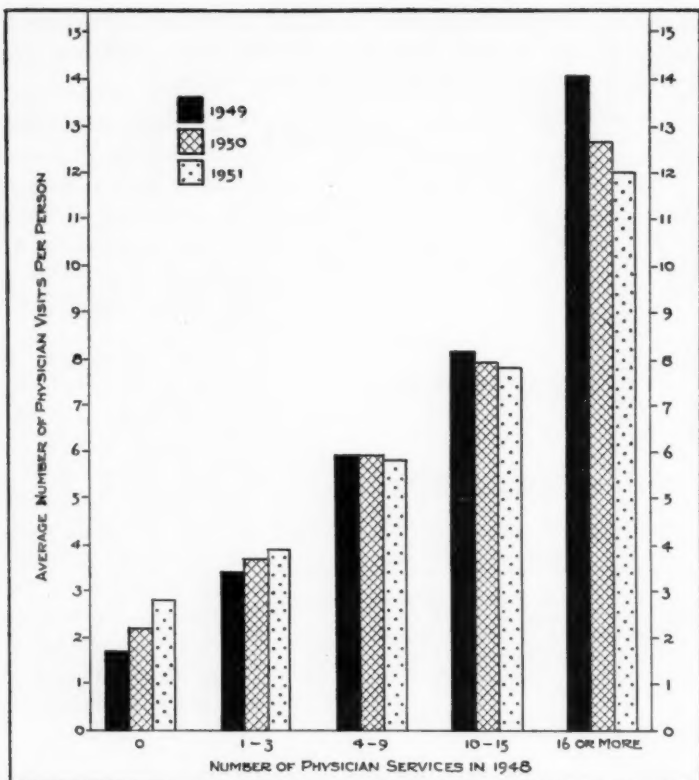


Fig. 2. Average annual utilization rates in 1949, 1950 and 1951 among groups of HIP members classified by utilization in 1948. Data based on a 10 per cent sample of the HIP population enrolled throughout the period January 1, 1948-December 31, 1951.

of malconditions, symptoms, etc., and who would therefore fall in the extreme "healthy" class of a continuum that ranges from "healthy" to "chronically ill?"

The importance of the questions raised is, of course, heavily conditioned by the degree to which persons have a tendency to remain at the same utilization level. The study reported here is concerned with this issue and has as its objectives:

1. To determine the extent to which individuals who are

high utilizers of physician services in one year remain high utilizers in succeeding years; similarly to determine consistency in utilization among low utilizers. Also, to establish whether such characteristics as age, sex or duration in HIP can be used to identify sub-groups that have an unusually high degree of consistency in utilization.

2. To determine whether family units show any greater or lesser consistency in their year to year pattern of utilization than do individuals and whether family size is a factor.

STUDY SETTING

The Health Insurance Plan of Greater New York (HIP) is a prepaid voluntary plan now about 12 years old. It is organized on a group practice basis and provides comprehensive medical care.⁵ Persons covered are entitled to receive medical care from family physicians and specialists in the office, the home and the hospital. Preventive and diagnostic medical services and tests, treatment of illness, as well as physical therapy and services of visiting nurses are included. The only medical services excluded are treatment by a psychiatrist, purely cosmetic surgery, care for drug addiction, anesthesia, and care for chronic illnesses in institutions other than general hospitals.

There are no waiting periods for service in HIP, no exclusions from enrollment because of preexisting conditions, and no limitation on the number of services or duration of medical care. Medical services are provided by physicians associated with 32 medical groups. Each medical group receives an annual capitation payment for each insured person in that group. Members receive no bill for medical services, the premium paying the entire cost. (The only exception is a possible \$2.00 charge for a night call to the home between 10 P.M. and 7 A.M.).

METHODOLOGY

Statistics in this report are derived from an enrollment card

⁵ Initial enrollment is on a group basis only, the usual requirement being that at least 75 per cent of those eligible enroll. Contracts ordinarily provide for coverage of the employee, spouse, and unmarried children under 18 years of age. Members leaving a group may convert to an individual contract.

prepared for each HIP subscriber and from a physician's report form on which the physician records information about each contact with an HIP member. The enrollment card gives the age, sex, and history of all changes in coverage status for each person insured. In general, physician visits refer to face-to-face contacts between the physician and the patient in the office, home, or hospital. Each visit, (including pre-operative, post-operative, prenatal), is counted as a separate physician service.

The group under study consists of 22,809 individuals in a 10 per cent random sample of employees of the City of New York and their dependents enrolled in HIP continuously from January 1, 1954 to June 30, 1957.⁶ This interval was divided into three one-year periods: January–December, 1954, July 1955–June 1956, July 1956–June 1957.⁷ A punch card was prepared for each individual and each family indicating the number of physician services received in each of these time periods. Individuals were classified into one of the following utilization categories for each year.

UTILIZATION DURING 1954

<i>Utilization Level</i>	<i>Per Cent of Persons Enrolled in 1954</i>
Low — 0 Services	25.9
1–2	25.5
Moderate— 3–9	34.9
High —10 or More Services	13.7
(10–16)	(8.2)
(17 or More Services)	(5.5)

In classifying families into one of 4 utilization categories,

⁶ City employees and their dependents represented about 69 per cent of the total enrollment in HIP during this period. The restriction of the study group to those continuously enrolled results in the exclusion of all children born during the period, deaths, and persons who either entered or dropped HIP between January 1954 and June 1957. The excluded groups comprised 29 per cent of the average enrollment of city employees and their dependents.

⁷ Throughout the report the period July 1955–June 1956 is referred to as "1955" and July 1956–June 1957 as "1956."

from low to high, account must be taken of the fact that large families will generally have more physician services than small families if for no other reason than their having more persons. This was done from a detailed frequency distribution of *families* by number of services received by the total family. Separate class intervals were chosen for each size family in such a way that about the same proportion of families fell in each utilization class as is shown above for individuals.

Thus, for 2 person families, the lowest utilization class consisted of families with less than 3 services; for 4 person families it consisted of families with less than 9 services. At the other end of the scale, a 2 person family was classified as a high utilizer if it received 20 or more services. (See Appendix Table F4 for definition of low and high utilization families).

Tabulations were run to determine the utilization experience in succeeding years of individuals (and families of specified size) who were low, moderate and high utilizers in 1954.

Two series of tables have been prepared for this report. One set gives percentages and distributions as observed. The text is based almost entirely on these data. The other set (see appendix tables) presents observed figures in greater detail and percentages that would be expected if utilization in one year did not influence utilization in future years. A discussion of how these expected values were derived and their interpretation is contained in the technical appendix.

FINDINGS

A. Low and High Utilization in a Single Year

Before considering consistency in remaining at the same utilization level from year to year, it is worth examining whether the extremes in utilization (low and high) appear to be concentrated in a particular segment of the HIP population. Variables available for study included age, sex, year of enrollment in HIP, and family size.

1. *Individual Enrollees.* From Table 2, it is apparent that

the likelihood of an enrollee being a low or high utilizer varies moderately with age and sex. Children have especially low percentages at the extremes of the utilization scale (i.e. no physician visits and 17 or more visits). Among adults, the proportion that did not see a physician in a year increased with age and there was a slight increase with age in the per cent that saw a physician at least 10 times. A higher proportion of adult males under 60 than adult females did not visit a physician during the year—but fewer of them received large volumes of service. Differences between adult males and females were present even when women who were delivered by HIP physicians during the study period were excluded.

Adults who joined HIP in 1952-53 had, on the whole, a somewhat similar pattern of utilization as those who became members in the first few years of HIP's program (Table 3).

Table 2. Distribution of HIP members of specified age and sex by number of physician visits in 1954.

AGE AND SEX	TOTAL NUMBER OF PERSONS	PER CENT OF ALL PERSONS BY NUMBER OF PHYSICIAN VISITS					
		Total	None	1-2	3-9	10-16	17 or More
ALL PERSONS	22,809	100.0	25.9	25.5	34.9	8.2	5.5
Children ¹	7,834	100.0	20.4	28.0	40.7	8.0	2.8
Adults	14,975	100.0	28.8	24.1	31.9	8.3	6.9
Under 45	9,178	100.0	27.4	25.8	32.0	8.0	6.7
45-59	4,803	100.0	30.3	21.8	32.2	8.5	7.2
60 or More	706	100.0	36.8	18.1	27.9	10.3	6.8
Adult Males ²	7,508	100.0	31.5	25.1	31.6	6.7	5.1
Under 45	4,266	100.0	31.0	27.3	31.7	5.9	4.1
45-59	2,646	100.0	31.6	23.0	31.5	7.3	6.5
60 or More	455	100.0	35.8	17.4	29.5	10.1	7.3
Adult Females ²	7,467	100.0	26.1	23.1	32.2	9.9	8.6
Under 45	4,912	100.0	24.3	24.6	32.3	9.9	8.9
45-59	2,157	100.0	28.7	20.3	33.1	10.0	8.0
60 or More	251	100.0	38.6	19.5	25.1	10.8	6.0
Adult Females (Excluding Those Delivered by HIP Doctors, 1954-1957)							
Total	6,547	100.0	28.4	23.9	32.7	8.6	6.4
Under 45	3,992	100.0	27.7	26.3	33.0	7.7	5.3

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

¹ Subscribers' children under 18 years of age excluding those born January 1, 1954-June 30, 1957.

² Includes persons of unknown age.

YEAR OF ENROLLMENT AND SEX		TOTAL NUMBER OF PERSONS	PER CENT OF ALL PERSONS BY NUMBER OF PHYSICIAN VISITS					
			Total	None	1-2	3-9	10-16	17 or More
All Adults		14,975	100.0	28.8	24.1	31.9	8.3	6.9
Enrolled	1947-1949	8,982	100.0	27.8	23.5	32.8	8.6	7.2
	1950-1951	2,560	100.0	30.8	25.5	28.9	8.4	6.5
	1952-1953	3,433	100.0	30.1	24.6	31.8	7.3	6.2
Adult Males		7,508	100.0	31.5	25.1	31.6	6.7	5.1
Enrolled	1947-1949	4,486	100.0	29.6	24.7	32.6	7.1	5.9
	1950-1951	1,289	100.0	34.7	25.8	27.7	7.0	4.9
	1952-1953	1,733	100.0	33.9	25.5	31.9	5.3	3.4
Adult Females		7,467	100.0	26.1	23.1	32.2	9.9	8.6
Enrolled	1947-1949	4,496	100.0	25.9	22.3	33.1	10.1	8.6
	1950-1951	1,271	100.0	26.8	25.2	30.1	9.8	8.2
	1952-1953	1,700	100.0	26.3	23.6	31.7	9.3	9.1

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

Table 3. Distribution of adult males and females enrolled in HIP for varying periods of time by volume of physician visits in 1954.

The only group in which there was some relationship between year of enrollment and volume of service was the adult male category for which more recent enrollment appeared to be associated with a relatively low percentage of high utilizers. Although these results concern individuals in a wide variety of employment groups that entered HIP between 1947 and 1953, they suggest that duration in HIP (after the initial years of enrollment) may not exert a strong influence on the patterns of utilization in a single year. To examine this issue further would require presently unavailable data on the utilization pattern of a cohort at various intervals following enrollment.

2. *Size of Family.* Some indication of the relationship between family size and the utilization of physician services by individuals is found in Table 4. Although data are given for only 3 family sizes, i.e. 1-person, 3-person and 4-person, it is clear that there is no association between size of family and the likelihood of an individual being a high utilizer. However, non-utilization decreases as family size increases. Actually, as seen from the following figures, the proportion of non-

NUMBER OF PHYSICIAN VISITS RECEIVED BY A FAMILY MEMBER	PER CENT OF ALL PERSONS IN FAMILIES OF SPECIFIED SIZE		
	Members of One Person Families	Members of Three Person Families	Members of Four Person Families
TOTAL	100.0	100.0	100.0
No Service	37.4	24.5	20.1
1-2 Services	20.6	24.0	28.1
3-9 Services	29.1	35.7	38.7
10 or More Services	12.9	15.8	13.1
Total Number of Persons	2,048	4,848	6,576

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

Table 4. Distribution of HIP members in families of specified size by number of physician visits in 1954.

utilizers in one-person families is exceptionally high whether the comparison is with all other enrollees or with only other adults.

*Per Cent of Persons With No
Physician Visits in 1954*

1-Person Families	37.4
2 or More Person Families	
Adults and Children	24.8
Adults Only	27.5

In summary, the utilization patterns by age, sex, year of enrollment in HIP, and family size, show some differences. In a few instances they are fairly large, e.g. children as a group are low in both high utilizers and non-utilizers; one-person families are high in non-utilizers. Nevertheless, the margins that separate categories from one another are not so large that some groups can be viewed on the one hand as being unimportant in a study of utilization patterns or on the other hand as being the focal point for such a study. In other words, *an intensive examination of low and high utilizers should be concerned with all ages, males and females and all family sizes.*

*B. Year to Year Consistency in Utilization Level
of Individuals*

HIP members followed for the 3 year period 1954-1956, were more likely to remain at the same utilization level from year to year than would be expected if one year's experience were independent of the previous year's. This was true for all utilization levels—low, medium, and high. The categories that are of primary interest in this paper are the two extremes of the distribution and the discussion that follows concerns individuals who were high utilizers (10 or more services) in 1954 and those who did not see a physician that year.

Table 5. Per cent of HIP members who were non-utilizers or high utilizers in 1954 who remain at same utilization level in succeeding years, by age, sex and date of enrollment in HIP.

AGE AND SEX, DATE OF ENROLLMENT IN HIP	NON-UTILIZERS IN YEAR 1 (1954)				HIGH UTILIZERS (10 OR MORE SERVICES) IN YEAR 1 (1954)			
	Total Number	Per Cent Who Remain in Same Class in			Total Number	Per Cent Who Remain in Same Class in		
		Year 2	Year 3	Years 2 and 3		Year 2	Year 3	Years 2 and 3
TOTAL	5,914	49.7	46.0	31.0	3,119	36.5	33.2	20.9
Children ¹	1,598	44.0	39.6	26.7	849	33.3	24.5	16.7
Adult Males ²	2,365	50.4	46.6	30.1	888	39.4	35.2	24.7
Under 45	1,323	48.6	43.1	26.5	427	36.5	31.1	21.8
45-59	837	52.1	50.5	33.8	366	42.9	38.5	27.9
60 or More	163	54.6	56.4	41.1	79	41.8	43.0	27.8
Adult Females ²	1,951	53.6	50.4	35.5	1,382	36.5	37.3	21.1
Under 45	1,195	49.0	44.9	30.0	923	33.9	36.0	18.5
45-59	619	59.1	56.4	41.8	387	41.9	40.6	26.6
60 or More	97	72.2	72.2	58.8	42	40.5	42.9	26.2
Adult Females (Excluding Those Delivered by HIP Doctors, 1954-1957)	1,862	55.5	52.3	37.2	977	39.9	38.6	24.0
Under 45	1,106	51.7	47.6	32.3	518	38.8	37.3	22.0
Adults Enrolled in HIP								
1947-1949	2,493	52.0	49.8	33.9	1,426	40.5	37.6	24.3
1950-1951	788	51.4	46.6	30.5	381	33.1	36.2	20.5
1952-1953	1,035	51.7	46.2	31.0	463	32.6	33.5	18.4

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

Year 1 is 1954; Year 2 is July 1955-June 1956; Year 3 is July 1956-June 1957.

¹ Subscribers' children under 18 years of age excluding those born January 1, 1954-June 30, 1957.

² Includes persons of unknown age.

High Utilizers. Over a third (36.5 per cent) of the high utilizers in 1954 remained high utilizers in 1955 and a fifth (20.9 per cent) were high utilizers in both 1955 and 1956 (Table 5). This suggests a fairly rapid attenuation in the group of high utilizers and the possibility that if extended an additional 2 or 3 years there would be a negligible proportion left. However, receipt of at least 10 physician services year after year is a stringent requirement for classifying an individual as "a characteristically high utilizer."

Movement out of a utilization class one year may be followed by a return to that class in a subsequent year and any such tendency would appear to be an important factor to take into account. As shown below, when the experience of the 1954 high utilizers is examined 2 years later, fully a third are found to be high utilizers again. It is also of considerable interest that about a quarter of them were not seen at all by a doctor in 1956, or had only 1 or 2 physician visits that year. This illustrates the need for finding some way to identify the high utilizer who will continue to be a high utilizer and not treating all high utilizers in a specific year as a homogeneous category. (For more detailed data see Appendix Tables P1-P5).

<i>Utilization Class</i>		<i>Per Cent of 1954 High Utilizers in Specified Class in 1956</i>
Low	—No Physician Visits	8.3
	1-2	16.9
Medium—	3-9	41.6
High —	10 or More	33.2

Minor variations in these relationships occurred among various subgroups of the HIP population (Table 5). For example, a somewhat higher proportion of adult males than adult females continued as high utilizers from year to year. This difference disappeared entirely when the comparison excluded women who gave birth during the study period, and whose need for large volumes of care was restricted for the most part

to the comparatively short interval covering prenatal and postpartum care.

There is also some indication that adults under 45 were

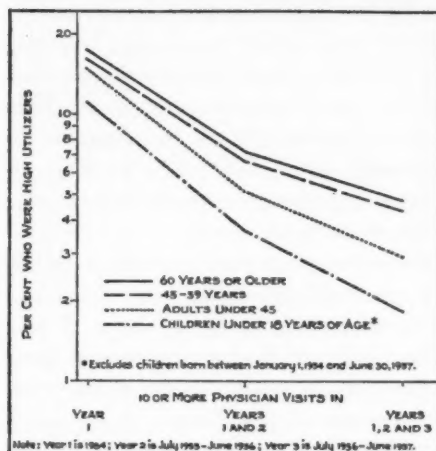


Fig. 3. Per cent of HIP members who were high utilizers, three successive years of experience, 1954-1956. Data based on a 10 per cent sample of persons insured through the City of New York throughout the period January 1, 1954-June 30, 1957.

continue as high utilizers than were more recent enrollees.

When some of the above findings are related to the earlier observations regarding high utilizers in 1954, an interesting pattern emerges. From Figure 3 (plotted on a semi-logarithmic scale), it can be seen that the rate of decline in the proportions that remained high utilizers was lowest among individuals who had the greatest proportions of high utilizers in 1954 (i.e. older adults); the most rapid decline occurred in the group with the lowest proportion of high utilizers in 1954 (i.e. children). (Appendix Table P-6).

Influence of the High Utilizers on Overall Utilization. In assessing the significance of the preceding for an operating medical care program, it is useful to consider how large the groups of high utilizers are and the proportion of the total

slightly less likely to remain high utilizers than older adults. As regards children, a lower proportion of the 1954 high utilizers continued as high utilizers in succeeding years than was the case for adults.

One other comparison is worth mentioning; this concerns year of enrollment in HIP. Judging from this type of data, persons in the Plan for a comparatively long time were more likely to con-

volume of services they receive. It is apparent from the following figures that only a small segment of the total HIP population can be designated as characteristically high utilizers, i.e. whether the criterion for this designation is 3 consecutive years of high utilization or 2 alternate years. The important point, however, is that this small group accounts for an appreciable portion of the total volume of services. This is seen a little more clearly when estimating the decrease in the utilization rate that would result if it were possible to identify individuals who had a tendency to remain high utilizers and to alter their future pattern.

Under the extreme assumption that the utilization of all of these individuals could be modified so that they had the same utilization as other members, there would be a 17 per cent reduction in the utilization rate during the second year of the program and a 25 per cent reduction in the third year. These proportions are, of course, upper limits of a highly theoretical set of circumstances but they indicate quite impressively the importance of studying the high utilizer more closely.

<i>Year in Which Utilization was High</i>	<i>Per Cent of Total HIP Who Were High Utilizers (10 or More Services in a Year)</i>	<i>Per Cent of Total Services Received by High Utilizers</i>
1954	13.7	52.4
1954, 1955, 1956	2.9	13.3
1954, 1956	4.5	19.7

Non-Utilizers. Half (49.7 per cent) of the non-utilizers in 1954 did not see an HIP physician the following year and 31.0 per cent did not see a doctor in either 1955 or 1956⁸ (Table 5). These proportions are considerably greater than would be expected if the experience after 1954 were independent of the utilization in 1954. It is also clear, however, that if consistency

⁸ As indicated previously, non-utilization refers to HIP medical care and some of the "non-utilizers" may have seen a physician outside of HIP. Any intensive study of "non-utilizers" would have to concern itself with characteristics of two groups; those who did not see any physician and those who saw only a doctor outside HIP.

is defined as non-utilization in several consecutive years, the "consistent" non-utilizer group falls off fairly rapidly as the number of years increases. Thus, 1 in 4 of all HIP members were non-utilizers in 1954; 1 in 12 were non-utilizers in all 3 study years.

As in the case of high utilizers, a somewhat different impression regarding "consistency" is obtained if the definition takes into account movement back into the non-utilization class. The following figures show, for example, that in 1956 almost half of the 1954 non-utilizers did not see a physician. It will also be noted that the proportion (6 per cent) who had many doctor visits two years later was small but far from inconsequential. This demonstrates once again the importance of not treating all persons in a specific utilization class one year as a homogeneous group. Among non-utilizers as among high utilizers there is a need for finding characteristics that distinguish individuals who have a tendency to continue at the same utilization level from those who do not.

<i>Utilization Class</i>		<i>Per Cent of 1954 Non-Utilizers in Specified Class in 1956</i>
Low	—No Physician Visits	46.0
	1-2	26.8
Medium—	3-9	21.2
High —	10 or More	6.0

At all ages in both sexes, there was greater consistency in year to year non-utilization than could be explained by chance factors.⁹ The patterns, however, differed in a number of respects. Children, the group that had the lowest proportion of non-utilizers in 1954, experienced the sharpest decline in the proportion that remained non-utilizers as additional years came under observation (Table 5, Figure 4, Appendix Table P 6).

With regard to adults, there was a slightly greater tendency for females than males to remain non-utilizers. Also, the older

⁹ See Technical Appendix for discussion of tests of statistical significance.

the adult (in both sexes) the greater the chance that a non-utilizer in one year would continue to be a non-utilizer. This parallels the earlier finding that the per cent of non-utilizers during 1954 increased with age. "Year of enrollment" and consistency in non-utilization showed no association at all.

Probably the most interesting of the above findings is the relationship between age and non-utilization among adults. It may reflect, of course, the fact that utilization refers to medical care from HIP physicians only, and one cannot ignore the possibility that older persons are more apt than others to depend completely on physicians outside of HIP. It seems unlikely though that this could reverse the picture. Actually, even if the aged followed the same pattern as other age groups, there would be considerable point in learning more about the circumstances that result in a sizable segment of the population highly subject to chronic disease to be consistent non-utilizers over a 3 year period.

C. Size of Family and Year to Year Consistency in Family Utilization

Thus far the discussion has been concerned with the experience of individuals. Some of the variables identify groups that

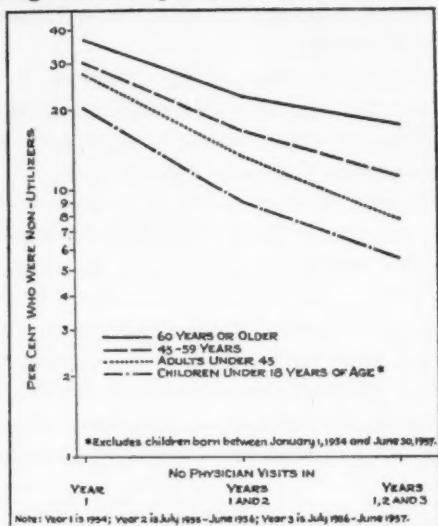


Fig. 4. Per cent of HIP members who were non-utilizers, three successive years of experience, 1954-1956. Data based on a 10 per cent sample of persons insured through the City of New York throughout the period January 1, 1954-June 30, 1957.

FAMILY SIZE	LOW ¹ UTILIZERS IN YEAR 1 (1954)				HIGH ¹ UTILIZERS IN YEAR 1 (1954)			
	Number of Families	Per Cent Who Remain in Same Class in			Number of Families	Per Cent Who Remain in Same Class in		
		Year 2	Year 3	Years 2 and 3		Year 2	Year 3	Years 2 and 3
One Person	766	62.0	59.0	44.1	265	42.6	38.9	26.4
Two Persons	702	57.8	51.6	38.6	381	37.3	37.8	21.3
Three Persons	410	51.7	49.5	34.4	193	37.3	31.1	22.3
Four Persons	463	52.1	48.2	31.3	228	37.7	34.6	23.2
Five or More Persons	207	57.5	46.9	35.3	93	36.6	33.3	20.4

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

Year 1 is 1954; Year 2 is July 1955-June 1956; Year 3 is July 1956-June 1957.

¹ For definitions of low and high utilizers see Appendix Table F4.

Table 6. Per cent of families in HIP who were low utilizers or high utilizers in 1954, who remain at same utilization level in succeeding years. (Families classified by size.)

have comparatively high proportions remaining high or low utilizers from year to year, but with one or two exceptions, the differentials are not especially large. The question arises whether another axis of classification—the family—would be more efficient in identifying clusters that have particularly large proportions at the same utilization level for a number of years.

Table 6 gives the patterns followed by families of different sizes; utilization being defined as the total number of physician services received by all family members.¹⁰ From these data it would appear that no one family size has a much more consistent pattern than the others. The most deviant group is the 1-person family unit. Here the proportions of 1954 low and high utilizers that remain at these levels in 1955 and 1956 were somewhat greater than was true for larger family units.

Another issue related to family utilization is the possibility that high utilizers tend to concentrate in the same families and similarly for non-utilizers. If this were so and if the number of such instances were sufficiently large then a study of high (or low utilizers) would be more efficient if it were

¹⁰ For discussion of class intervals selected to classify families as low and high utilizers see Technical Appendix.

family centered than if the individual were the primary unit under observation.

Data for 3-person family units strongly suggest that this is not a critical factor (Appendix Table F3). In only 1 per cent of the families were all 3 members high utilizers and these individuals, as shown below, represented a small fraction of the total number of high utilizers. Restriction of a study to families that had all its members in the same utilization class would also exclude a large majority of the non-utilizers. The situation, however, is not as extreme as in the case of high utilizers. With 1 in 5 of the non-utilizers involved, it would be of value to examine the circumstances under which all persons in a family fail to see an HIP physician in the course of a year.

Per Cent of 3-Person Families With All 3 Members	
Non-Utilizers	4.9
High Utilizers (10 or More Physician Visits)	1.1
Per Cent of All Non-Utilizers Found in Families	
Where All Members Were Non-Utilizers	21.1
Per Cent of All High Utilizers Found in Families	
Where All Members Were High Utilizers	7.0

Conclusions. The study of three years of utilization of physician services in HIP reported here, indicates that consistent high utilizers and non-utilizers are found in each age-sex group, and among both seasoned "enrollees" and comparative "newcomers."

Children are the least likely to be either high utilizers or non-utilizers during the year and experience the most rapid decline in the proportions that remain at these utilization levels from year to year. The reverse situation occurs among persons 60 years of age or older. This age group has the highest proportions of high and low utilizers when utilization is measured over a single year or a longer time period. Data by family size identify the 1-person unit as having comparatively more low utilizers than any other type of family and as

having the greatest year to year consistency in low utilization.

While these differences in patterns are important, they are not so large that some categories can be designated as being of no interest and others as holding all of the interest for further inquiries regarding consistent high or low utilizers. Actually, the decision as to whether additional investigation is worthwhile for any group is dependent on the criteria for judging "consistency" and on whether the group so defined has an impact on overall utilization. In the present, early stages of investigation of high and low utilization, it would seem desirable to apply a definition that is not too restrictive, e.g. one that brings under observation individuals who either remain at the same utilization level for several years or have a tendency to keep returning to the same level. The longer the time period the firmer the basis for this type of approach, but even within the limits of the 3 year experience examined, there is strong evidence that "consistent" high utilizers under such a definition have an important influence on total utilization. Similarly, "consistent" non-utilizers form a significantly large group.

The results of the current study give ample justification for inquiring further into the issue of consistency in utilization. The direction and purpose of future investigations would, however, have to be quite different from the one reported here. Their concern would be with the circumstances that result in "consistent" high or low utilization; also, whether any of the important circumstances appear to be amenable to change and if so, to what extent past experience can be used to identify individuals whose future utilization of medical care might be affected by such changes.

In a broad sense, all of these questions are subsidiary to the basic question of whether in a group practice setting such as HIP, traditional methods of providing care can be altered to the benefit of the patient and at a saving in medical costs. This is a long-range issue which may very well require experimental approaches to find the answer. However, before con-

sidering the form of such experiments or for that matter whether there would be any point to them, a great deal of additional information is needed.

With regard to the "consistent" high utilizers, the first requirement would be a clarification of the medical conditions for which care is received and an assessment of the degree to which this care is supportive or directed at somatic conditions. The distinction between the two is, of course, frequently far from clear. Implicit in the problem is the need to define so-called "normal" patterns of medical care in the presence of specified somatic conditions and to isolate deviations from these patterns. The HIP setting offers an unusual opportunity for pursuing this line of inquiry. Favorable circumstances include the availability within the HIP population of well-defined groups that have been enrolled at least 7 or 8 years, from which study and control cases can be obtained; the ability to keep a large majority under observation in the future; and the accessibility of information regarding past illnesses for which medical care was received in HIP.

With regard to the consistent non-utilizers, the primary issues are related to health status, perception of need, reaction to symptoms, social and economic background and past experience with medical care. In short, if the significance of non-utilization for future medical requirements is to be pursued very far, it would be necessary to take a socio-psychological approach and to develop a device for measuring health status or determining existing medical conditions (recognized and unrecognized) in the non-utilizer.

TECHNICAL APPENDIX

CLASSIFICATION OF UTILIZATION LEVELS

Basic considerations in the classification of individuals as low, medium or high utilizers in this study were the uneven distribution of physician visits during the year among HIP members and the desire to have as the two end groups, categories which were potentially of considerable significance to a medical care plan such as HIP. Thus, non-utilizers were designated as a separate class since they represented a substantial proportion (1 in 4) of the total enrollment.

Appendix Table P1. Percentage distribution of HIP members with specified utilization experience in 1954 by utilization in two successive years. (Utilization level refers to number of physician visits.)

UTILIZATION LEVEL IN JULY 1955-JUNE 1956 BY LEVEL IN 1954	UTILIZATION LEVEL IN JULY 1956-JUNE 1957				
	Total	No Service	1-2	3-9	10 or More
<i>All Utilization Levels in 1954</i>					
TOTAL	100.0	24.2	26.2	36.4	13.2
No Service (July 1955-June 1956)	25.4	12.7	6.8	4.9	0.9
1-2	26.0	6.4	8.9	8.9	1.7
3-9	35.4	4.3	8.9	17.3	4.9
10 or More	13.2	0.8	1.6	5.3	5.5
<i>No Service in 1954</i>					
TOTAL	100.0	46.0	26.8	21.2	6.0
No Service (July 1955-June 1956)	49.7	31.0	11.0	6.5	1.2
1-2	26.3	9.5	8.8	6.7	1.3
3-9	19.0	4.8	6.0	6.3	2.0
10 or More	5.0	0.7	1.0	1.7	1.4
<i>1-2 Services in 1954</i>					
TOTAL	100.0	24.9	31.4	35.9	7.9
No Service (July 1955-June 1956)	26.2	10.9	8.6	5.9	0.8
1-2	32.1	8.3	11.2	10.8	1.7
3-9	33.6	4.7	9.8	15.8	3.4
10 or More	8.1	1.0	1.7	3.4	2.0
<i>3-9 Services in 1954</i>					
TOTAL	100.0	13.8	25.7	46.0	14.5
No Service (July 1955-June 1956)	13.5	4.5	4.2	3.9	0.9
1-2	25.9	4.6	8.9	10.4	2.0
3-9	46.7	4.1	10.9	25.2	6.5
10 or More	14.0	0.6	1.7	6.5	5.0
<i>10 or More Services in 1954</i>					
TOTAL	100.0	8.3	16.9	41.6	33.2
No Service (July 1955-June 1956)	8.1	2.6	2.2	2.4	0.9
1-2	14.2	1.8	4.8	5.9	1.6
3-9	41.2	2.9	7.7	20.8	9.8
10 or More	36.5	1.1	2.1	12.4	20.9

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

Furthermore, there was special interest in this group because of the particular questions that could be raised about "consistent" non-utilizers.

Persons with 10 or more services during the year were selected as "high utilizers" for several reasons. Although they were a small segment of the HIP population (14 per cent) they accounted for over

Appendix Table P2. Utilization in successive years by HIP members classified by utilization level in 1954, children and adults. (Utilization level refers to number of physician visits.)

AGE AND UTILIZATION LEVEL IN YEAR 1 (1954), AND SEX	NUMBER OF PERSONS IN SPECIFIED CLASS YEAR 1 (1954)	PER CENT OF ALL PERSONS WHO REMAIN IN SAME CLASS IN				
		Year 2		Year 3 ²	Years 2 and 3	
		Observed	Expected ¹		Observed	Expected ¹
<i>All Persons</i>						
Low: No Service	5,914	49.7	25.4	46.0	31.0	12.7
1-2 Services	5,806	32.1	26.0	31.4	11.2	8.9
Medium: 3-9 Services	7,970	46.7	35.4	46.0	25.2	17.3
High: 10 or More Services	3,119	36.5	13.2	33.2	20.9	5.5
(10-16 Services)	(1,868)	(20.0)	(8.0)	(17.0)	(5.9)	(1.7)
(17 or More Services)	(1,251)	(26.5)	(5.2)	(24.4)	(13.9)	(1.6)
<i>Children³</i>						
Low: No Service	1,598	44.0	19.6	39.6	26.7	8.8
1-2 Services	2,196	36.4	29.2	34.6	14.2	11.5
Medium: 3-9 Services	3,191	53.3	41.5	51.4	31.7	23.4
High: 10 or More Services	849	33.3	9.7	24.5	16.7	3.8
<i>Adult Males</i>						
Low: No Service	2,365	50.4	30.5	46.6	30.1	15.4
1-2 Services	1,884	30.6	25.8	30.6	10.1	8.1
Medium: 3-9 Services	2,371	41.4	31.6	42.1	20.9	13.8
High: 10 or More Services	888	39.4	12.1	35.2	24.7	5.4
<i>Adult Females</i>						
Low: No Service	1,951	53.6	26.2	50.4	35.5	14.2
1-2 Services	1,726	28.2	22.8	28.2	8.8	7.0
Medium: 3-9 Services	2,408	43.2	33.0	42.8	20.8	14.5
High: 10 or More Services	1,382	36.5	18.0	37.3	21.1	7.5
<i>Adult Females (Excluding Those Delivered by HIP Doctors, 1954-1957)</i>						
Low: No Service	1,862	55.5	28.3	52.3	37.2	15.8
1-2 Services	1,568	29.7	23.5	29.2	9.6	7.4
Medium: 3-9 Services	2,140	44.8	33.0	44.1	22.0	14.9
High: 10 or More Services	977	39.9	15.2	38.6	24.0	6.6

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

Year 1 is 1954; Year 2 is July 1955-June 1956; Year 3 is July 1956-June 1957.

¹ Expected obtained under assumption that utilization in years 2 and 3 is independent of utilization in Year 1.

² Experience observed in Year 3 without regard to utilization in Year 2. "Expected" values are virtually same as for Year 2.

³ Subscribers' children under 18 years of age, excluding those born January 1, 1954-June 30, 1957.

half the services, and as a group they had on the average almost four times the number of physician visits as all HIP members. Consistency in this class, even if only moderate, would have a significant impact on the total volume of medical care received.

A sub-classification of "17 or more services" was provided for very high utilizers. This group accounted for almost a third of all the physician visits, although it represented only 6 per cent of the enrollment. Because of the small number of very high utilizers in the 10 per cent sample used for this study, data regarding year to year consistency at this high a level of utilization are presented only for the total sample.

Two utilization classes were formed for persons who were neither non-utilizers nor high utilizers. One category consisted of individuals with 1 or 2 services during the year and contained almost a fourth of all the enrollees. Despite the comparatively large number in this

Appendix Table P3. Utilization in successive years by HIP members classified by utilization level in 1954, adult males by age. (Utilization level refers to number of physician visits.)

AGE AND UTILIZATION LEVEL IN YEAR 1 (1954)	NUMBER OF PERSONS IN SPECIFIED CLASS YEAR 1 (1954)	PER CENT OF ALL PERSONS WHO REMAIN IN SAME CLASS IN				
		Year 2		Year ³ 3	Years 2 and 3	
		Observed	Expected ¹		Observed	Expected ¹
<i>Males Under 45</i>						
Low: No Service	1,323	48.6	29.9	43.1	26.5	13.6
1-2 Services	1,163	33.0	28.3	31.8	10.7	9.2
Medium: 3-9 Services	1,353	40.3	31.4	43.5	21.1	14.4
High: 10 or More Services	427	36.5	10.4	31.1	21.8	4.4
<i>45-50</i>						
Low: No Service	837	52.1	31.1	50.5	33.8	17.4
1-2 Services	609	26.3	22.8	28.9	9.2	6.9
Medium: 3-9 Services	834	42.7	31.9	41.0	20.4	13.0
High: 10 or More Services	366	42.9	14.2	38.5	27.9	6.5
<i>60 or More</i>						
Low: No Service	163	54.6	32.3	56.4	41.1	20.9
1-2 Services	79	26.6	18.9	25.3	7.6	4.6
Medium: 3-9 Services	134	46.3	32.1	36.6	22.4	12.5
High: 10 or More Services	79	41.8	16.7	43.0	27.8	8.8

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

¹ Year 1 is 1954; Year 2 is July 1955-June 1956; Year 3 is July 1956-June 1957.

² Expected obtained under assumption that utilization in Years 2 and 3 is independent of utilization in Year 1.

³ Experience in Year 3 without regard to utilization in Year 2. "Expected" values are virtually same as for Year 2.

low utilization class, the group accounted for only 7 per cent of the total volume of services. The other category, designated "medium" utilizers consisted of persons with 3 to 9 services in a year. About a third of the HIP population were in this class and they received a third of all the physician visits. Also, the overall average number of services per person per year (about 5 physician visits) was contained within this category.

The class intervals described above were used for all subgroups of individuals. Accordingly, absolute rather than relative standards were established for judging low, medium or high utilizers. A high utilizer in a specified age-sex group, for example, was defined as

Appendix Table P4. Utilization in successive years by HIP members classified by utilization level in 1954, adult females by age. (Utilization level refers to number of physician visits.)

AGE AND UTILIZATION LEVEL IN YEAR 1 (1954)	NUMBER OF PERSONS IN SPECIFIED CLASS YEAR 1 (1954)	PER CENT OF ALL PERSONS WHO REMAIN IN SAME CLASS IN				
		Year 2		Year ³ 3	Years 2 and 3	
		Observed	Expected ¹		Observed	Expected ¹
<i>All Females Under 45</i>						
Low: No Service	1,195	49.0	24.7	44.9	30.0	12.1
1-2 Services	1,207	26.6	23.6	27.3	8.0	7.2
Medium: 3-9 Services	1,587	41.7	33.1	42.5	20.0	14.7
High: 10 or More Services	923	33.9	18.5	36.0	18.5	7.4
<i>Females Under 45 (Excluding Those Delivered by HIP Doctors, 1954-1957)</i>						
Low: No Service	1,106	51.7	27.8	47.6	32.3	14.2
1-2 Services	1,049	28.7	24.9	28.7	9.1	7.9
Medium: 3-9 Services	1,319	43.9	33.2	44.6	21.8	15.4
High: 10 or More Services	518	38.8	14.0	37.3	22.0	5.8
<i>45-59</i>						
Low: No Service	619	59.1	28.1	56.4	41.8	17.4
1-2 Services	437	31.6	21.5	31.3	10.8	6.7
Medium: 3-9 Services	714	45.9	33.0	43.3	22.1	14.2
High: 10 or More Services	387	41.9	17.4	40.6	26.6	8.0
<i>60 or More</i>						
Low: No Service	97	72.2	38.6	72.2	58.8	29.1
1-2 Services	49	28.6	17.9	24.5	12.2	5.6
Medium: 3-9 Services	63	49.2	30.7	39.7	20.6	12.4
High: 10 or More Services	42	40.5	12.7	42.9	26.2	6.4

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

Year 1 is 1954; Year 2 is July 1955-June 1956; Year 3 is July 1956-June 1957.

¹ Expected obtained under assumption that utilization in Years 2 and 3 is independent of utilization in Year 1.

² Experience in Year 3 without regard to utilization in Year 2. "Expected" values are virtually same as for Year 2.

someone who had at least 10 physician visits during the year regardless of the proportion that fell in the category. This approach had advantages over the use of class intervals that varied in accordance with how physician services were distributed in each subgroup. Common intervals made it possible to examine the relationship between utilization and such characteristics as age and sex. Also, categories of enrollees could be expanded or contracted as the analysis required. And, finally, in a medical care program, the point of view regarding who is a high utilizer or a low utilizer is the same whether the individual is in a class that has relatively many or relatively few persons with such utilization.

A different approach had to be taken with regard to family utiliza-

Appendix Table P5. Utilization in successive years by HIP members classified by utilization level in 1954, adults classified by year of enrollment in HIP. (Utilization level refers to number of physician visits.)

YEAR OF ENROLLMENT IN HIP AND UTILIZATION LEVEL IN YEAR 1 (1954)	NUMBER OF PERSONS IN SPECIFIED CLASS YEAR 1 (1954)	PER CENT OF ALL PERSONS WHO REMAIN IN SAME CLASS IN				
		Year 2		Year ^a 3	Years 2 and 3	
		Observed	Expected ¹		Observed	Expected ¹
<i>All Adults</i>						
Low: No Service	4,316	51.8	28.4	48.4	32.6	14.8
1-2 Services	3,610	29.4	24.3	29.4	9.5	7.6
Medium: 3-9 Services	4,779	42.3	32.3	42.5	20.8	14.1
High: 10 or More Services	2,270	37.7	15.0	36.5	22.5	6.4
<i>Entry 1947-1949</i>						
Low: No Service	2,493	52.0	27.6	49.8	33.9	14.7
1-2 Services	2,114	30.0	24.1	30.2	10.0	7.8
Medium: 3-9 Services	2,949	43.4	32.8	43.4	21.6	14.4
High: 10 or More Services	1,426	40.5	15.5	37.6	24.3	6.8
<i>Entry 1950-1951</i>						
Low: No Service	788	51.4	30.0	46.6	30.5	15.4
1-2 Services	652	29.8	25.2	27.5	9.0	7.3
Medium: 3-9 Services	739	42.2	31.3	39.5	19.4	13.0
High: 10 or More Services	381	33.1	13.6	36.2	20.5	6.0
<i>Entry 1952-1953</i>						
Low: No Service	1,035	51.7	29.1	46.2	31.0	14.6
1-2 Services	844	27.7	24.3	29.0	8.4	7.2
Medium: 3-9 Services	1,091	39.3	31.8	41.8	19.7	14.2
High: 10 or More Services	463	32.6	14.8	33.5	18.4	5.7

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

Year 1 is 1954; Year 2 is July 1955-June 1956; Year 3 is July 1956-June 1957.

¹ Expected obtained under assumption that utilization in Years 2 and 3 is independent of utilization in Year 1.

² Experience in Year 3 without regard to utilization in Year 2. "Expected" values are virtually same as for Year 2.

tion. The primary function of family data was to provide a basis for determining whether family size influenced consistency in the volume of physicians services received by the total family. A classification of utilization levels for families was required for this purpose and it obviously had to take into account the number of persons exposed, i.e. family size.

The following approach was adopted. First, a detailed frequency distribution of families by number of physician visits was obtained for 1, 2, 3, 4, 5 or more person families. Then dividing points were established for each distribution so that about the same proportion of families fell in each of 4 utilization classes. The criterion used for determining the proportions was the magnitude of the class intervals for individuals. Thus, since the lowest utilization class among in-

Appendix Table P6. Per cent of HIP members who were non-utilizers or high utilizers by age, three successive years of experience. (Utilization level refers to number of physician visits.)

AGE IN YEAR 1 (1954) AND SEX	NUMBER OF HIP MEMBERS	PER CENT OF ALL HIP-MEMBERS WHO WERE NON-UTILIZERS				
		Year 1	Years 1 and 2		Years 1, 2 and 3	
			Observed	Expected ¹	Observed	Expected ¹
TOTAL	22,809	25.9	12.9	6.6	8.0	1.6
Children ²	7,834	20.4	9.0	4.0	5.5	0.7
Adults ³	14,975	28.8	14.9	8.2	9.4	2.3
Under 45	9,178	27.4	13.4	7.5	11.3	1.9
45-59	4,803	30.3	16.7	9.0	17.6	2.7
60 or More	706	36.8	22.5	12.7	5.5	4.7

		PER CENT OF ALL HIP MEMBERS WHO WERE HIGH UTILIZERS (10 OR MORE SERVICES)				
		Year 1	Years 1 and 2		Years 1, 2 and 3	
			Observed	Expected ¹	Observed	Expected ¹
TOTAL	22,809	13.7	5.0	1.8	2.9	0.2
Children ²	7,834	10.8	3.6	1.0	1.8	0.1
Adults ³	14,975	15.2	5.7	2.3	3.4	0.4
Under 45	9,178	14.7	5.1	2.2	2.9	0.3
45-59	4,803	15.7	6.6	2.4	4.3	0.4
60 or More	706	17.1	7.1	2.6	4.7	0.5

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York who were enrolled throughout the period January 1, 1954-June 30, 1957.

¹ Expected obtained under assumption that utilization in a particular year is independent of the utilization in prior years.

² Subscribers' children under 18 years of age excluding those born January 1, 1954-June 30, 1957.

³ Includes persons of unknown age.

dividuals (i.e. non-utilizers) had about a fourth of the total enrollment in HIP, the corresponding class for each family size consisted of approximately the same proportion of families with the lowest utilization. As indicated in Table F4 this procedure could not be followed precisely, but none of the deviations is large enough to affect the analysis.

EXPECTED VALUES FOR TESTS OF INDEPENDENCE BETWEEN 2 YEARS' UTILIZATION

A major interest in this study was to determine whether persons who are low or high utilizers in one year have a greater tendency to repeat this utilization experience in future years than might be expected by chance. To test this hypothesis, expected values were computed under the assumption that a person's utilization level in

Appendix Table F1. Utilization in successive years by HIP families who were low utilizers or high utilizers in 1954. Families of specified size.

SIZE OF FAMILY	PER CENT OF ALL FAMILIES WHO REMAIN IN SAME CLASS IN YEAR 2 ¹					
	Low Utilizers ²			High Utilizers ³		
	Number in Specified Class in Year 1 (1954)	Observed	Expected ⁴	Number in Specified Class in Year 1 (1954)	Observed	Expected ⁴
One Person	766	62.0	35.9	265	42.6	13.8
Two Persons	702	57.8	28.7	381	37.3	14.4
Three Persons	410	51.7	25.7	193	37.3	11.9
Four Persons	463	52.1	27.8	228	37.7	12.9
Five or More Persons	207	57.5	27.9	93	36.6	11.2
SIZE OF FAMILY	PER CENT OF ALL FAMILIES WHO REMAIN IN SAME CLASS IN YEARS 2 AND 3 ¹					
	Low Utilizers ²			High Utilizers ³		
	Number in Specified Class in Year 1 (1954)	Observed	Expected ⁴	Number in Specified Class in Year 1 (1954)	Observed	Expected ⁴
One Person	766	44.1	22.7	265	26.4	6.0
Two Persons	702	38.6	16.2	381	21.3	6.2
Three Persons	410	34.4	14.7	193	22.3	4.9
Four Persons	463	31.3	14.7	228	23.2	5.9
Five or More Persons	207	35.3	14.3	93	20.4	4.3

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York, who were enrolled throughout the period January 1, 1954-June 30, 1957.

¹ Year 1 is 1954; Year 2 is July 1955-June 1956; Year 3 is July 1956-June 1957.

² For definition of family utilization level see Appendix Table F4.

³ Expected obtained under assumption that utilization in Years 2 and 3 is independent of utilization in Year 1.

1955, for example, was independent of his utilization in 1954. Thus, among adults who were high utilizers in 1954, the "expected" proportion who would be high utilizers in 1955 was 15.0 per cent, i.e. the proportion of *all* adults who had this volume of service in 1955. The "observed" figure was 37.7 per cent.

Similarly, "expected" values were obtained under the assumption that utilization in the 2 successive years 1955 and 1956 was independent of the level in 1954. Among adults who were high utilizers in 1954, the "expected" proportion who would be high utilizers in 1955 and 1956 was 6.4 per cent, i.e. the proportion of *all* adults who had this volume of service. The "observed" figure was 22.5 per cent.

"Observed" and "expected" percentages are given in Appendix Tables P1-5¹¹ for individuals and in Appendix Tables F1-2 for families.

The hypothesis that high, low or medium utilizers in 1954 have no greater likelihood of being at the same utilization level in succeeding years than might be expected by chance, may be tested as follows:

$$t = \frac{P_o - P_e}{\sqrt{\frac{P_e \times Q_e}{N_o}}}$$

Where P_o = the *observed* value—the per cent of persons of specified age, sex, etc. in a stated utilization class in 1954, who were in the same class in the year (s) under observation.

P_e = the *expected* value—the per cent of *all* persons of specified age, sex, etc. in stated utilization class in year (s) under observation.

N_o = the number of persons of specified age, sex, etc. who were in stated utilization class in 1954.

As "t" increases, the likelihood that a difference between observed and expected values is due to random factors decreases. When $t = 2$, chances are about 1 in 20 and the hypothesis is rejected with a mod-

¹¹ Appendix table P6 gives "observed" and "expected" percentages computed on a different basis than in Appendix tables P1-5. In the latter tables, the percentages refer to the experience in years 2 and 3 among members with specified experience in year 1. In Appendix Table P6, the "observed" percentages refer to the proportions of *all* members who utilize at a specified level in years 1, 1 and 2, or 1, 2 and 3. "Expected" percentages are obtained under the assumption that utilization in one year is independent of the utilization in any other year. Accordingly, the "expected" percentage of members in a particular utilization class in all 3 years (1, 2 and 3) is $P_1 \times P_2 \times P_3$, where P_i is the percentage observed in the *i*th year.

erate degree of confidence. When $t \geq 2.6$, chances are less than 1 in 100 and the hypothesis is rejected with a high degree of confidence.

Actually, "t" is very large for virtually all of the differences between observed and expected values given in the appendix tables. For example, in the case of adults who were high utilizers in 1954, the "t" value corresponds to a probability of less than .001, when high utilization in 1955 is under question.

$$t = \frac{37.7 - 15.0}{\sqrt{\frac{(15.0)(85.0)}{2270}}} \text{ or a very large number}$$

From the above discussion, it is apparent that persons who are low or high utilizers in one year have a greater tendency to repeat this utilization experience in future years than might be expected by chance. The data given in this report, however, do not provide a ready basis for measuring the strength of this tendency. For this

Appendix Table F2. Utilization in successive years by HIP families who were low utilizers or high utilizers in 1954. Families of specified size excluding those with deliveries by HIP doctors, 1954-1957.

SIZE OF FAMILY	PER CENT OF ALL FAMILIES WHO REMAIN IN SAME CLASS IN YEAR 2 ¹					
	Low Utilizers ²			High Utilizers ³		
	Number in Specified Class in Year 1 (1954)	Observed	Expected ³	Number in Specified Class in Year 1 (1954)	Observed	Expected ³
Two Persons	682	58.7	29.6	328	39.3	13.7
Three Persons	387	53.7	29.4	120	45.0	10.5
Four Persons	428	55.1	30.5	181	39.8	11.8
Five or More Persons	181	59.1	29.6	62	40.3	10.5
SIZE OF FAMILY	PER CENT OF ALL FAMILIES WHO REMAIN IN SAME CLASS IN YEARS 2 AND 3 ¹					
	Low Utilizers ²			High Utilizers ³		
	Number in Specified Class in Year 1 (1954)	Observed	Expected ³	Number in Specified Class in Year 1 (1954)	Observed	Expected ³
Two Persons	682	39.7	17.3	328	23.2	5.9
Three Persons	387	36.2	17.0	120	28.3	4.5
Four Persons	428	33.6	16.8	181	23.8	5.5
Five or More Persons	181	39.8	17.4	62	19.4	3.9

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York, who were enrolled throughout the period January 1, 1954-June 30, 1957.

¹ Year 1 is 1954; Year 2 is July 1955-June 1956; Year 3 is July 1956-June 1957.

² For definition of family utilization level see Appendix Table F4.

³ Expected obtained under assumption that utilization in Years 2 and 3 is independent of utilization in Year 1.

purpose it would be necessary to determine the probability of movement from one rank order to another.¹² This is a function of the particular class the individual is in during the first year under observation (1954) and the amount of movement required to go from one class to another. The problem is most acute when comparisons of relative stability involve an end-category, such as high utilizers, and medium utilizers (3-9 services). Among the former, the only change that results in a shift in utilization class is a decrease in volume of services below 10; among medium utilizers both an increase and a decrease would produce a change in utilization class. For such comparisons, separate probability functions would have to be defined. This is beyond the scope of the current report. However, one approach for defining the function follows:¹³

The probability that an individual changes his utilization rate in two successive years is expressed as a function of the first year rate, x_1 , the second year rate, x_2 , and a parameter N . The parameter N will be small when there is little tendency to change utilization rate, and it will be large when individuals tend to repeat the same rate from year to year.

A frequency distribution function $F_N(x_1, x_2)$ will describe the above concept, where $F_N(x_1, x_2)$ is the relative frequency of the combination x_1 and x_2 under the circumstance of a "degree of stability," N .

The probability of individuals with an initial rate between a and b having a second year rate in this same interval is given by

$$P_N(a, b) = \frac{1}{b-a} \int_a^b \int_a^b F_N(x_1, x_2) dx_1 dx_2$$

Assuming some convenient distribution function F , which will decrease as the difference between x_1 and x_2 increases and which will decrease with increasing N , values of $P_N(a, b)$ can be calculated for a number of values of N . The degree of consistency, N , of an observed population can be determined from the observed value of $P(a, b)$ by interpolating between these calculated values.

Using the function $F_N(x_1, x_2) = Cx_1 e^{-N|x_1-x_2|}$, where Cx_1 is a func-

¹² For a classic discussion of the issues involved in this problem see Reference 4.

¹³ This approach has been suggested and developed by Dr. George B. Hutchison, who has pointed out the need to base comparisons of relative stability in year to year utilization on this type of probability function.

tion dependent on x_1 alone, values for $P_N(0, 25)$ have been calculated as follows:

N	$P_N(0, 25)$
0	.25
2	.45
3	.69
∞	.100

In an observed population .50 of individuals in the lowest quartile (0 to 25 percentile) of utilization in one year remained in this quartile the second year. This observed population would be said to have a degree of consistency, $N = 2.4$ by interpolating in the tabulated values.

EXPECTED VALUES FOR TEST OF INDEPENDENCE OF UTILIZATION BY FAMILY MEMBERS

Another question investigated in the current study was whether low or high utilizers tended to concentrate in the same families; more particularly, was the number of families with all members low or high utilizers greater than would occur by chance. To examine this issue for 3-person families, expected values were computed under the assumption that each family member's utilization was independent of the other. Thus, the expected number of 3-person families in

Appendix Table F3. Proportion of families with all members in the same utilization class, three member families, HIP.

UTILIZATION CLASS OF FAMILY MEMBERS	PER CENT OF FAMILIES WITH ALL 3 MEMBERS IN SAME UTILIZATION CLASS	
	Observed	Expected ¹
<i>Low</i>		
No Services	4.9	1.3
1-2 Services	1.6	1.4
<i>Medium</i>		
3-9 Services	6.8	5.2
<i>High</i>		
10 or More Services	1.1	0.3

NOTE: Data based on a 10 per cent sample of persons insured through the City of New York, who were enrolled throughout the period January 1, 1954-June 30, 1957.

¹ Expected obtained under the assumption that an individual's utilization level is independent of utilization by other members of the same family unit.

which all members are high utilizers was obtained as follows¹⁴ (Appendix Table F-3 gives expected and observed values in percentages):

$$N_e = 1616(.15)^3 = 1616(.0034) = 5.5$$

where .15 is the proportion of persons in a 3-member family who received 10 or more services in a year, and 1616 is the number of 3-person families.

The observed number of 3-person families with all members high utilizers was 17, and

$$\text{Chi-square} > 20 \text{ and } P < .001$$

Similarly, for non-utilizers, the expected number of families with all 3 persons not having seen a doctor during the year is:

$$N_e = 1616(.232)^3 = 20.3$$

The observed value is 79; chi-square is very large; $P < .001$

Accordingly, in the case of 3-person families, there was a greater tendency for families to have all members at the same utilization level than would be expected by chance. As discussed in the text, however, the proportions of families that fall in this category were low and the number of individuals involved represent a small minority of the total number of high or low utilizers.

DEFINITIONS

Data for both individuals and families are based on the experience of a 10 per cent sample of employees of the City of New York, or related agencies,¹⁵ and their insured dependents enrolled in HIP continuously from January 1, 1954 through June 30, 1957. Persons added to the insurance rolls after January 1, 1954 as well as those who dropped HIP coverage during the study period were excluded from the sample.

Subscriber refers to the person in whose name the insurance is written. In this study, the subscriber is an employee of the City of

¹⁴ A more precise way of determining the expected number would be to take into account the fact that a 3-person family unit must consist of either 1 parent and 2 children or 2 parents and 1 child. The latter is by far the more common situation and under this circumstance, $N_e = 1616 P_1 P_2 P_3$ where the P 's represent the proportions of adult males, adult females, and children who are in the specified utilization class. However, these values were not available for 3-person family units.

¹⁵ Refers to City Departments, including the Board of Education, County Departments, Transit Authority and Tri-Boro Bridge and Tunnel Authority.

New York. On enrollment in HIP he insures his spouse and all unmarried children under the age of 18 years. No other dependents of the subscriber are eligible for coverage.

Age refers to the individual's age as of January 1, 1954.

Entry Date refers to the year of the subscriber's original enrollment in HIP. Accordingly, husbands and wives of city employees who were added to the HIP insurance rolls before 1954 but after the subscriber's coverage became effective are classified by the subscriber's entry year. For the most part, the insured spouses included in the study sample joined HIP at the time the subscriber enrolled in the plan.

Family Size refers to the number of family members eligible for HIP coverage who were enrolled throughout the period January 1, 1954 to June 30 1957. Thus family size is constant. Members of one person families are subscribers who had no spouse or children under 18 years of age.

Appendix Table F4. Classification of HIP families by utilization level definition and percentage distribution.

UTILIZATION LEVEL	FAMILY SIZE				
	One Person	Two Persons	Three Persons	Four Persons	Five or More Persons
DEFINITION OF UTILIZATION LEVEL: ¹ NUMBER OF PHYSICIAN VISITS RECEIVED BY FAMILY IN YEAR					
Class 1 (Low)	0	0-2	0-5	0-8	0-9
Class 2	1-2	3-6	6-11	9-15	10-17
Class 3	3-9	7-19	12-30	16-33	18-37
Class 4 (High)	10 or More	20 or More	31 or More	34 or More	38 or More
PERCENTAGE DISTRIBUTION OF FAMILIES IN 1954					
Number of Families	2,048	2,483	1,616	1,644	810
Percentage Distribution					
TOTAL	100.0	100.0	100.0	100.0	100.0
Class 1 (Low)	37.4	28.3	25.4	28.2	25.6
Class 2	20.6	21.8	25.2	24.1	27.7
Class 3	29.1	34.6	37.4	33.9	35.3
Class 4 (High)	12.9	15.3	11.9	13.9	11.5

¹ See Technical Appendix for description of the basis of classifying families by utilization level.

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THE ASSOCIATION OF HEALTH AND SOCIAL WELFARE PROBLEMS IN INDIVIDUALS AND THEIR FAMILIES

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INTRODUCTION

A SIZABLE body of information has been accumulated which suggests, with varying degrees of certitude, a positive correlation between physical illness and various aspects of social pathology (1). About this relationship it has often been stated that an analysis of the characteristics of individuals is not sufficient to describe its nature but that it is necessary to consider the families to which the individuals belong. So far, however, few empirical data have been analyzed in this fashion.

This study attempts to evaluate the nature of some of the interactions between the health experience of the members of a family and their social welfare problems which have required attention of community agencies. Two specific questions are considered. The first one can be stated as: What effect do age, sex, size of family, and the nature of the social problem have on the association of health and social welfare problems in individuals? The second question relates to the main interests of this work and can be phrased as follows: Given specified relationships of health and social welfare problems in individuals, what can be said about the association of these problems in families?

SOURCES OF DATA

The present study is an outgrowth of a broad research program carried on by the Department of Biostatistics, Graduate School of Public Health, University of Pittsburgh (2). As a part of this program, 2,370 families obtained by a random sampling of the Arsenal Health District in Pittsburgh, Pennsyl-

¹ University of Pittsburgh, Pittsburgh, Pennsylvania, and National Institute of Mental Health, Bethesda, Maryland.

vania, were interviewed in the summer of 1951 and again in the summer of 1952. The interviews provided identifying information on these families and data on their health experience. A responsible adult was questioned in each household of the survey sample about the health of all members of the family. From these reports, data were obtained concerning *health problems*. An individual was considered ill if he was reported as having one or more of the following in either the 1951 or the 1952 survey: illnesses during the past month; accidents, injuries, and hospitalizations in the past year; chronic diseases or physical impairments of long standing (3).² Experience in this and similar studies has shown that collecting information in this fashion provides a sufficiently accurate indication of the total amount of sickness in a population. However, the technique may be inaccurate for calculating the frequency of specific diseases. For example, it was found that some under-reporting occurs with respect to venereal diseases and psychiatric conditions (4). For this reason no effort is made in the present work to examine the data by specific diagnostic groupings.

By using the identifying information obtained in the health survey we were able to clear all the families in the sample with the Social Service Exchange and so to determine their social welfare status. The definition of a social welfare problem is therefore independent of the definition of a health problem. It is based on a separate source of information—the Social Service Exchange. This Exchange registers new cases opened by each of the 105 member agencies in the Pittsburgh area and its clearings provide an adequate coverage of the social services rendered in the community. The registering agencies include the Department of Public Assistance, family agencies, courts, social service departments of hospitals, sectarian welfare agencies, and a variety of others.

To collect information about social problems, case records for the families known to the Exchange were located at the

² Exclusive of pregnancy, delivery, and health examinations.

registering agencies and abstracts of the records were made. Information was obtained regarding data of initial contact, nature of the problem, and disposition of the case. Medical facts which were related to the social problem and verified by a physician were also recorded (4).

Demographic and socioeconomic characteristics of the population of the Arsenal Health District, and of the sample drawn from it, were described by Horvitz (3). Some characteristics of the persons considered as having social problems will be described in this paper. In general, most of the recipients of social welfare services are found in the lower socioeconomic groups.

QUESTIONS RAISED BY PREVIOUS FINDINGS

From the analysis of information on the health and social welfare experience of the families, Ciocco et al., found that those reporting any health problems in the household survey had a greater risk of being known to the Social Service Exchange than the families not reporting health problems. It was found further that this excess risk also existed when the definition of registration with the Exchange was restricted to families who contacted social agencies for reasons not involving health (5). The analysis also indicated that the association of health and social problems in families was strongly affected by various social characteristics of the family (4).

These findings, while of considerable interest, raised questions concerning their meaning and proper interpretation. Illness, as defined in the survey, was essentially based on experience of individuals, and social problems arose as a result of associations, actions, and characteristics of individuals. However, a large number of patterns in the experience of groups of persons (i.e., families) could produce the association observed on a family basis. For instance, a family was considered as having both a health and a social problem if:

- a. One or more persons in the family were reported as having a health problem and if the needs of one or more of these

ill persons brought the family into contact with a social agency.

b.. One or more persons in the family were reported as having a health problem, and one or more persons *without health problems* precipitated contact with a social agency.

Situations "a" and "b" may exist in a variety of combinations, all of which class the family as having both a health and a social problem. The analysis presented in this paper was undertaken to evaluate and clarify the contributions of such different patterns to the existence of the association.

DEFINITION OF SOCIAL PROBLEMS IN INDIVIDUALS

In the previous studies conducted by the Department of Biostatistics of the Pittsburgh School of Public Health, it was possible to consider registration with the Social Service Exchange alone as a sufficient indication of the presence of a social welfare problem in a family (4). In the present study it was necessary to relate the problem situation in the family to one or more individuals centrally involved with the problem. We have attempted to single out the person or persons in the family whose needs, behavior, or experience *immediately preceding the application* for social services made the application necessary.

To maintain consistency in the assignment of social problems to individuals, the decisions taken in each case were recorded. When the preliminary assignment of problems was completed, the record was reviewed and a set of general rules was abstracted. The individual decisions were then re-examined to assure consistency in the application of the rules. The assignment took into account the nature of the social problem, the agency involved, characteristics of the person requesting social services, etc. The following paragraphs contain a brief resume of the principles embodied in these rules and a few examples of their application.

The various reasons for application to social agencies were coded according to a detailed classification developed by the Family Service Association of America. Using this system, in-

dividuals with social problems were then classified into the following broad groups:

1. Persons who had contact with social welfare agencies primarily for *health reasons*.

In general, situations in which the main reason for the social agency contact was difficulty in providing medical care are considered social problems related to health and are attributed to the ill person. Other situations in which social agency help was needed are classed here if they arose directly because of illness of the individuals in question.

Included among persons with social problems due to health reasons are those receiving services from the Visiting Nurses Association, those on the Aid to the Disabled program of public assistance, and others who required social services from various agencies because physical or mental illness interfered with their proper functioning.

2. Persons whose *behavior* produced a need for social services. (The recipient of the service is not necessarily classed as having a social problem.)

Marital difficulties, police intercessions which led to social agency services, contacts with social workers of the courts, and similar situations belong in this category. A frequent marital problem included here is a wife's complaint to a social agency or court regarding her husband's drinking, abusiveness, and non-support. In these situations, the husband is considered as the individual with the social problem. Cases of neglect of children are generally considered as social problems attributable to the mother, unless there was a complaint of non-support against the father. In situations which were not clear-cut, each spouse is classed in the category of *other* problems (see below). Where services of social agencies were needed because of juvenile or adult delinquency, the problem is of course attributed to the delinquent person.

3. Persons who had contact with social welfare agencies for *combinations of major reasons* or several contacts each for a

different reason, when one or more of these reasons was *related to health* (as defined in No. 1 above).

4. Persons who had contacts with social welfare agencies for reasons *other* than those classified under 1, 2, and 3, and problems which could not readily be classified elsewhere.

In this category, most of the problems relate to employment, some to housing, and others to need for legal advice in matters which could not be considered behavioral problems, etc.

An example of persons in this category is given by the healthy wage-earner of a family who lost his job and applied for public assistance. Also classified here is the person whose house burned and for this reason social welfare services were extended to him, or the person who required aid in legal difficulties arising in the course of his business and who could not afford services of a lawyer. The category also includes persons in poorly defined social situations requiring agency assistance in which it could not be determined definitely whether they or someone else should be considered as causing the need for service. All individuals who were directly involved in these ambiguous situations were classified in this category.

FINDINGS ON INDIVIDUALS

Of the 2,370 families in the sample on which information was available in the survey, 2,248 are white. Previous reports on these data included information on 122 nonwhite families (4, 5). The nonwhite families are not included here because there are too few of them for analysis. Of the 2,248 white families, 661 were known to social agencies and case record information was available for them. An additional 150 families were registered with the Social Service Exchange but no further information was available regarding their social welfare experience. There are 1,437 families in the survey sample who were not registered with the Social Service Exchange.

Altogether, the 2,248 families include 3,997 males and 4,187 females. On the individual basis, a slightly higher percentage

SOCIAL PROBLEM STATUS	MALES		FEMALES	
	Total Number	Per Cent Reporting Health Problems	Total Number	Per Cent Reporting Health Problems
Persons With Social Problems	404	40.1	312	50.3
Persons With No Social Problems	3,346	35.0	3,595	38.4
Persons From Families With Nature of Social Problem Not Ascertainable (PNA)	247	38.9	280	40.4
TOTAL	3,997	35.8	4,187	39.5

Table 1. Per cent of individuals with health problems by the presence of social problems and sex, and the number on which each percentage is based.

of females than of males reported health problems (Table 1).³ Persons considered as having social problems reported illness in the survey somewhat more frequently than those without social problems. This increase of risk of a health problem with the presence of a social problem is more pronounced for females than males.⁴

From Table 1, it can also be seen that individuals in families registered with the Exchange but for whom no further social-problem information was available (PNA) exhibit percentages of health problems falling between those for persons with and without a social problem. This supports the assumption that no undue bias was introduced by the missing information. The PNA cases are, in general, those which have been inactive with the social agency for several years and consequently the case records relating to them had been destroyed. Compared with the rest of the sample, the PNA families tend to be somewhat smaller and tend to be composed of older persons (median age 37.4 years vs. median age 29.9 years in the rest of the sample). The characteristics of these families are analyzed more fully in a paper by Ciocco (4).

The age of individuals has some relation to the presence of

³ $P < 0.01$ that the difference between 39.5 and 35.8 is due to sampling.

⁴ $P < 0.05$ and $P < 0.01$ that the differences in these percentages for males and females respectively are due to sampling.

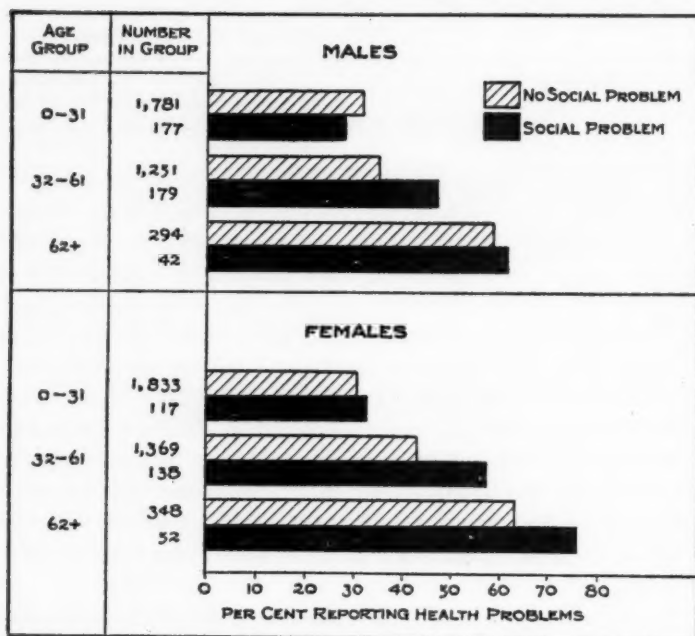


Fig. 1. Per cent of persons who reported health problems in groups of given age, sex, and social welfare status.

health and social problems (Figure 1). The percentage of persons reporting health problems on the survey is greater in the older age groups. Furthermore, only in the older age groups is there a distinct positive association between health and social problems.

The size of the family in which a person lives has no appreciable effect on the slight association of health and social problems among men or on the higher association of these problems among women (Figure 2).

The examination of the data up to this point raises a question about the meaning of the excess of health problems among persons with social problems. The idea readily suggests itself that many of the social agencies render services in connection with health problems, and, therefore, the population which they

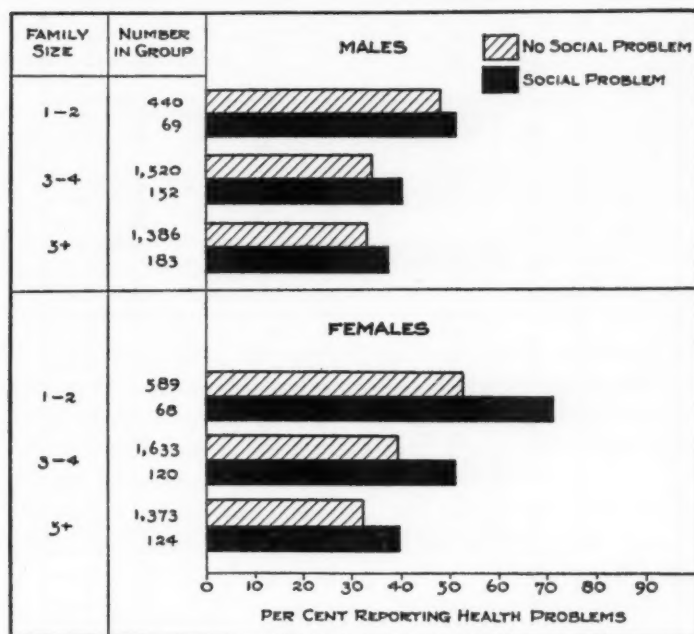


Fig. 2. Per cent of persons who reported health problems in families of given size, by sex and social welfare status of person.

serve would be selected on this basis. This possibility was explored in a previous paper (5). The findings published in that source indicate that when families are taken as units, the observed association can be explained in a large part by this type of selection. However, an excess of health problems was also observed in families who were known to the Social Service Exchange for behavior problems only. To explore this same question on an individual basis, Tables 2 and 3 are presented.

The findings of Table 2 indicate that the frequency of the different types of social problems varies with age and sex. In every age group, females are more likely than males to receive social services in connection with a health condition. Social problems related to health also occur most frequently in the age group 62 years and older for each sex. Among females in

Table 2. The percentage distribution of persons by their social problem status for each age-sex group.

SOCIAL PROBLEM STATUS	MALES					FEMALES				
	<21	22-41	42-61	62 +	Total	<21	22-41	42-61	62 +	Total
Health Alone	1.4	1.5	1.2	2.5	1.5	2.4	5.2	3.1	7.3	4.0
Behavior Alone	4.3	6.5	4.0	3.3	4.8	1.2	1.6	1.7	1.6	1.5
Health in Combination With Other Problems	0.5	2.5	2.6	3.6	1.9	0.1	1.1	1.2	1.8	0.9
Other Than Above	0.4	2.6	3.2	2.2	1.9	0.4	1.4	1.8	1.1	1.1
All Social Problems	6.6	13.1	11.0	11.6	10.1	4.1	9.3	7.8	11.8	7.5
PNA (All Persons From These Families)	4.6	5.4	8.7	7.9	6.2	5.5	5.6	8.8	8.9	6.7
No Social Problem	88.8	81.5	80.3	80.5	83.7	90.4	85.1	83.4	79.3	85.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number in Age Group	1,470	1,178	955	365	3,997 ^a	1,412	1,328	954	439	4,187 ^b

^a Includes 29 persons of unknown age.^b Includes 54 persons of unknown age.

SOCIAL PROBLEM STATUS	PER CENT WITH HEALTH PROBLEM		NUMBER IN SOCIAL PROBLEM GROUP	
	Males	Females	Males	Females
Health Alone	42.4	54.9	60	167
Behavior Alone	27.9	47.4	192	62
Health in Combination With Other Problems	58.9	50.0	76	36
Other Than Above	50.0	40.4	76	47
No Social Problem	35.0	38.4	3,346	3,595

Table 3. Per cent of persons reporting health problems in the survey by sex and social problem status.

the age group 22-41, the percentage with social problems related to health (5.2%) is somewhat higher than in the age groups under 22 years and 42-61 years. The increase may be partly attributable to the greater need for social services arising from pregnancy and childbirth.

Problems relating to behavior are found more frequently among males than among females. They are especially numerous among men in the age group 22-41, and they are found less often in the older age groups. Among females, age has no apparent relationship to the frequency of social problems due to behavior.

Men are classified in the category designated *health in combination with other problems* somewhat more frequently than women, but the proportion of both men and of women in this group increases with increasing age. The social problems grouped here include a health component and therefore it is of some interest to add them to the corresponding percentages in the category designated *health alone*. The relationships evident from such a combination are essentially the same as those discussed above for the category of *health alone*.

Under the heading of "Other than above" in Table 2 are found problems related to employment or social problems which could not be readily classified. The numbers in this category are fairly small, but it seems that males have employment problems and unclassified problems more frequently

than females and that these problems occur primarily in the middle age groups. This finding reflects partly the fact that some of these problems arise directly or indirectly from occupational pursuits common to adult men.

The percentage of persons reporting health problems in the survey is given in Table 3 for each category of social problems and for the *no-social-problem* group. Since age differences affect the frequency of various types of social problems and also of health problems, age should be taken into account when the various social problem groups are compared with the *no social problem* group. This was done by age adjusting the percentage of survey health problems for persons with no social problems (35.0% for males and 38.4% for females) to the age composition of each of the social problem groups. Such an adjustment does not substantially change the percentages for the *no social problem* group. No different or new relationships become apparent by including the age-adjusted percentages, and therefore only the crude percentages are presented here.

As the data in Table 3 indicate, men who had social problems related to *health in combination with other social problems* and women who had social problems related to *health alone* reported illness on the household survey most frequently. Among men with the *behavior* type social problems, reports of illness on the survey are somewhat less frequent than in the *no social problem* group. Women in the *behavior* social problem group reported illness on the survey with only a slightly lower frequency than women in the social problem groups involving health.

It may be noted that illness was reported in the survey for only half of the persons who were known to social agencies because of health reasons. The major factor in this discrepancy is time. Persons were considered as having a health problem in the survey on the basis of their health experience during the two years prior to June 1952. However, the data on social problems were obtained from case records of social agencies and often refer back for several years. We examined the frequency

with which illness was reported in the survey for people who were in touch with social agencies during the survey period for reasons of health alone. We found that 79 per cent of them reported health problems in the survey interviews.

Some of the health conditions for which services were being given by social agencies were not detected in the survey. This is due apparently to a bias in the reporting of certain conditions (e.g., mental illness, venereal disease) and due to slight differences in definitions used in the survey and by the agencies. The subject is discussed in another paper (5).

ASSOCIATION OF HEALTH AND SOCIAL PROBLEMS WITHIN FAMILIES

The preceding discussion pointed out that the association of health and social problems in individuals is affected by such variables as age and sex of the person and the nature of the social problem. We can now turn to the question of the effect of the experience of other members of his family on the association of health and social problems in the individual himself. An elemental analysis of these relationships is contained in Table 4.

Assuming the existence of a positive association, we would expect, a priori, that persons who are ill (and consequently from families reporting illness) would have the highest per-

Table 4. Per cent of persons with social problems by the health status of the individual and his family; for families of 2 to 6 persons.

HEALTH STATUS IN SURVEY		NUMBER OF PERSONS (FAMILIES 2-6 PERSONS)	PER CENT WITH			
Of Individual	Of Family ¹		Any Social Problems	Social Problems Related to Health ²	Social Problems Related to Behavior ²	Social Prob- lems Related to Behavior Which Were Active June 1950 to Dec. 1951 ²
Health Problem	Health Problem	2,504	10.10	5.52	3.74	0.60
No Health Problem	Health Problem	2,770	8.51	3.60	4.29	1.05
No Health Problem	No Health Problem	1,272	5.50	1.74	3.16	0.39

¹ A family with a health problem is one where one or more members have a health problem.

² Excluding 50 persons whose social problems could not be classed as either health or behavior.

centage of social problems. The next highest percentage of social problems would be found among the well persons from families reporting illness in one or more other members. We would expect to find the lowest percentage of persons with social problems among individuals from families where no one has a health problem. The percentages presented in Table 4 indeed follow the assumed pattern when all social problems are considered.

Social problems which are due to behavior (regardless of the possible presence of other social problems) show a different relationship. For these problems, there is not much difference in the risk among persons who are themselves ill (3.74%) and those in families with no one ill (3.16%). Persons in families with health problems who are themselves free of a health problem are, however, the ones who have the highest percentage of behavior problems (4.29%). Individuals in contact with social agencies during the survey period for reasons related to their behavior show the same tendency.⁵ The difference between 1.05 per cent and 0.39 per cent is not likely to be a result of sampling variation. Thus it appears that the presence of an ill person in a family was related to the risk of a behavior problem among other family members.

To study the second question which concerned association of problems within families, four hypotheses were formulated. Under Hypothesis I, families of a given size are considered to be random assortments of individuals in which each person possesses the *observed* probability of a health problem alone, a social problem alone, both problems, or neither problem. Effects of an association of health and social problems in individuals are therefore eliminated. The method employed in testing this hypothesis is described in the Appendix. It consists of computing the expected number of families in which a given

⁵ The period for which the health survey information was collected extends six months beyond the time for which the social service exchange clearings were available. A few additional families in the *no social problem* category may, therefore, have applied for social agency services in these six months. However, it is doubtful that this appreciably affects the findings presented here.

FAMILY SIZE	ALL FAMILIES		EXCLUDING FAMILIES WITH SOCIAL PROBLEMS RELATED TO HEALTH		EXCLUDING FAMILIES WITH SOCIAL PROBLEMS RELATED TO HEALTH AND ALL WITH CASE CLOSED PRIOR TO JUNE, 1950	
	X ²	P<	X ²	P<	X ²	P<
2	38.8	.005	7.4	.285	2.0	.572
3	59.9	.005	21.9	.009	11.7	.042
4	63.6	.005	39.1	.005	19.0	.008
5	50.3	.005	26.1	.011	15.6	.030
6	76.8	.005	—	—	19.0	.008

Table 5. X² comparisons of observed and expected distributions of persons under Hypothesis I, for families with various types of social problems, by size of family.

number of members experience illness or bring about a social problem. We would expect to obtain this number of families with the given outcome if families were like random groupings of the individuals in our population. The expected numbers can be compared with the observed numbers of families in which the specified combination of persons with health and social problems has actually occurred.

From Table 5 it appears that we can reject Hypothesis I even if the definition of social problems is restricted considerably. Families evidently cannot be considered as random aggregations of individuals with respect to the presence of social and health problems. This holds true even if we consider only those social problems which are connected with behavior and which also bring about registration with a social agency during the period covered by the survey.

To evaluate the nature of the deviations from Hypothesis I, two other hypotheses will be tested. Under Hypothesis II, families are regarded as random groupings of individuals when each person has the observed probability of a health problem. By expanding the $(p + q)^n$ binomial, we can determine for families of n persons how many families we would expect under Hypothesis II in which there would be no one ill, how many in which one person would be ill, and so on up to n . By summing

NUMBER OF PERSONS IN FAMILY WHO HAVE HEALTH PROBLEM	OBSERVED NUMBER OF FAMILIES WITH THIS OUTCOME	NUMBER OF FAMILIES EXPECTED UNDER HYPOTHESIS II
0	375	328.8
1	688	725.9
2	517	547.9
3 and More	235	212.4
TOTAL	1,815	1,815.0
	$X^2 = 12.63, d.f. = 3, P < 0.01$	

Table 6. Frequency distribution of families with none, one, two, or three and more persons with a health problem, as compared with the frequency distribution expected under Hypothesis II; for families of 2 to 6 persons.

the observed numbers of families with these outcomes among families of different sizes and comparing the observed frequencies with the expected ones (summed in a corresponding fashion), we can test Hypothesis II. The results are presented in Table 6.

Findings from this analysis can be interpreted as indicating an association of health problems in families. Comparison of the observed and the expected numbers reveals that there are more families in which no one has a problem, and also more families in which three or more members have health problems, than we would expect under Hypothesis II. This excess is compensated for by fewer families in which one or two members have a health problem than we would expect under Hypothesis II. Since this table represents a summary of the relationships found in families of specific sizes, the specific pattern might vary somewhat from one family size to another. However, for each family size more families in which no one had a health problem were observed than would be expected under Hypothesis II, and also there were more families in which several members had a health problem than would be expected. Thus, the summary contained in Table 6 is truly representative of the relationships observed in families of specific sizes.

The association of social problems in families was evaluated in the same manner as the association of health problems. Hypothesis III is that families can be regarded as random

NUMBER OF PERSONS IN FAMILY WHO HAVE SOCIAL PROBLEM	OBSERVED NUMBER OF FAMILIES WITH THIS OUTCOME	NUMBER OF FAMILIES EXPECTED UNDER HYPOTHESIS III
0	1,405	1,322.1
1	295	431.4
2	89	56.8
3 and More	26	4.7
TOTAL	1,815	1,815.0

$X^2 = 94.86$, d.f. = 2 (combining last 2 rows), $P < 0.01$

Table 7. Frequency distribution of families with none, one, two, or three and more persons with a social problem as compared with frequency distribution expected under Hypothesis III; for families of 2 to 6 persons.

groupings of individuals when each person has the observed probability of a social problem. The same treatment of the data as that used for health problems yielded Table 7 when it was applied to social problems. Table 7 shows the same kind of association for social problems in families as was observed for health problems. Again there are more families in which no one has a social problem, and there are also more families in which several members have a social problem than we would expect under Hypothesis III. When the numerical values of the two chi-square (X^2) criteria are compared, it becomes apparent that the association of social problems in families is considerably stronger than that of health problems. This may be due in part to the fact that once an individual within a family gets in touch with a social agency, the agency becomes more accessible to the other family members.

The analysis presented in Tables 6 and 7 clarifies the rejection of Hypothesis I by showing that health problems alone and social problems alone are not randomly distributed in families. Before we may conclude that a *bona fide* association between health and social problems exists in families, however, we have to reject the hypothesis that the observed association of health problems in families is independent of the observed association of social problems in families. This assumption constitutes Hypothesis IV. To test Hypothesis IV, we shall consider the probability of the joint outcome of n health prob-

lems and m social problems in each family to be the product of the relative frequency of families having n health problems and the relative frequency of families having m social problems. Thus, for instance, the probability of randomly selecting a family with no health problems and no social problems under

Hypothesis IV is considered to be $\frac{375}{1815} \times \frac{1405}{1815}$ (See Tables

6 and 7.) On this basis Table 8 has been constructed.

The analysis in Table 8 is based on all social problems regardless of their type or date of registration. It indicates that the presence of social problems in families is not independent of the presence of health problems in families, and the resulting

Table 8. Frequency distribution of families with the specified number of persons who have a health problem and a specified number of persons who have a social problem as compared with the frequency distribution expected under Hypothesis IV; for families of 2 to 6 persons.

NUMBER OF PERSONS IN FAMILY WHO HAVE THIS PROBLEM		OBSERVED NUMBER OF FAMILIES WITH THIS OUTCOME	NUMBER OF FAMILIES EXPECTED UNDER HYPOTHESIS IV	SIGN OF DIFFERENCE BETWEEN OBSERVED AND EXPECTED NUMBER
Social	Health			
0	0	318	293.4	+
0	1	536	538.5	-
0	2	394	399.8	-
0	3+	157	173.7	-
1	0	46	59.7	-
1	1	116	109.6	+
1	2	80	84.2	-
1	3+	53	41.4	+
2	0	9	17.8	-
2	1	31	32.3	-
2	2	36	25.4	+
2	3+	13	13.4	-
3+	0	2	4.2	-
3+	1	5	7.4	-
3+	2	7	7.6	-
3+	3+	12	6.6	+
		1,815	1,815.0	
			$X^2 = 25.98$	
			d.f. = 15	
			P = 0.038	

deviations are greater than we would expect from the knowledge that health problems and social problems separately are themselves associated in families. It can be noticed that outcomes in which the number of persons with a social problem was the same as the number with a health problem have an excess of observed families over the expected number. For instance, there is a greater number of observed than of expected families in which there are no social problems and no health problems, and also of families in which there is one social problem and one health problem, two social problems and two health problems, three social problems and three health problems. It is also interesting that with one exception, i.e., one social problem with three or more health problems, the above-mentioned outcomes of like numbers of social and health problems are the only ones in which there is an excess of observed over the expected number of families. For all other outcomes, we observe fewer families than we would expect under Hypothesis IV. Thus, it becomes apparent that the patterns of association of social problems in families are not independent of the patterns of association of health problems in families. From the value of the chi-square criterion, it appears that these relationships are not likely to be due to sampling variation.

The same type of analysis was applied to families in which persons were known to social agencies only for reasons due to their behavior and had also been registered with Social Service Exchange during the survey period (June 1950 to December 1951). This analysis reveals a pattern quite similar to the one presented in Table 8, but because of the small number of persons with social problems of this kind Hypothesis IV is not rejected (chi-square = 8.35 with 9 degrees of freedom). However, we can not conclude that the relationships seen in Table 8 do not apply to families who are currently registered with the Social Service Exchange and are known because of behavior problems only.

DISCUSSION

The foregoing tests of our four hypotheses show that even

after we account for the association of health and social problems in individuals, the distribution of persons with these characteristics in families does not approximate that which we would expect by randomly assigning persons into families. It is shown that the presence of a social problem in one of the family members is more often accompanied by the presence of a social problem in other family members than we would expect on the basis of a random distribution of social problems in the population. This relationship also appears to be true for health problems. Another interesting conclusion is that the observed distribution of persons with health problems in families is not independent of the observed distribution of persons with social problems in these families. By rejecting the hypothesis of the independence of these distributions, we can conclude that in addition to factors which produce a clustering of sick persons in families and factors which independently produce a clustering of persons with social problems in families, there are factors which affect both jointly.

The relationship of health and social problems among members of the same family is further clarified by the following finding: In families reporting illness the healthy members had a greater risk of a social problem due to behavior than persons from families not reporting illness (Table 4). This may help explain the observations of other investigators who found that a small number of families in one community received the largest proportion of the welfare services (9). This possibility justifies a further search for the causal elements involved in this association.

The workers in the fields of social welfare and public health have realized, primarily on an a priori basis and by unsystematic observation, that they share an area of common concern. It is of importance to verify this realization by the use of systematically collected data. A further clarification of the relationship between health and social welfare problems among family members should make it possible to formulate more effective social welfare and public health measures.

SUMMARY AND CONCLUSIONS

This investigation was carried out as a part of a broader research project conducted by the Department of Biostatistics, Graduate School of Public Health, University of Pittsburgh. In these previous studies, families were used as units of observation. On this basis it was found that families reporting health problems on a survey had a greater risk of being known to the Pittsburgh Social Service Exchange than those not reporting health problems.

The objective of the present work is an analysis of the association between health and social problems in terms of individuals. Two specific questions receive special attention. First, what effect do age, sex, size of family, and the nature of the social problem have on the association of health and social problems in individuals? Second, given specified relationships of health and social problems in individuals, how can we account for the association of health and social problems in families?

Findings related to the first question indicate that age, sex, and nature of the social problem affect the association of health and social problems in individuals. This association does not vary appreciably with differences in size of family.

Findings related to the second question of this study are quite conclusive. They indicate that even after the relationship of health and social problems in individuals is taken into account, families cannot be regarded as a random assortment of individuals. The nature of the deviations from non-randomness is complex, but some of its aspects have been singled out. It is shown that the presence of a health problem in one of the family members is accompanied by the presence of health problems in the other family members more often than we would expect if health problems were randomly distributed in the population. The same kind of relationship also appears to be true of social problems. A basic finding is that *healthy* persons in families reporting illness had a greater risk of being known

to social agencies for reasons of behavior than persons in families not reporting illness.

Further, it is found that the observed distribution of health problems in families is not independent of the observed distribution of social problems in these families. Therefore, we can conclude that, in addition to factors which affect the health experience of individuals in families and factors which independently affect the social welfare experience of individuals in families, there are factors which affect both jointly. Such a conclusion calls for further research into the mechanisms which produce this association.

APPENDIX

The testing of each of the four hypotheses employed above is based on a common principle. Families of a given size are classified according to the combination of people with the health and social characteristics which they contain. The procedure used in the categorizing of families is presented in this appendix.

The status of any one person with respect to health and social problems is described in terms of four mutually exclusive categories. An individual can have: (1) both a health and a social problem; or (2) a social problem only; or (3) a health problem only; or (4) neither a health nor a social problem. Each person from a family of a specified size is classified into one of these four categories, and the number in each category is determined. From the counts are obtained estimates of the probability associated with each of the four categories. The subsequent treatment of the estimated probabilities is determined by the nature of the hypothesis tested.

In formulating Hypothesis I we say, in effect, that the social and health experience of families size n can be described by randomly selecting groups of n persons. These are to be selected from a population in which there is the same proportion of persons in each of the four categories as in the families which we observed. Since these categories describe the joint outcomes of health and social problems in individuals, the corresponding probabilities will reflect any association between health and social problems in the individuals themselves. If these estimates are used in testing Hypothesis I, the association between health and social problems in

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individuals will not affect the test, since this association has already been isolated by determining the probabilities of the four joint outcomes in individuals. The procedure used in testing Hypothesis I is illustrated using families of two persons.

There were 414 families of two persons, or 828 people. Of these, 55 had both a health and a social problem; 381 had a health problem alone; 32, a social problem alone; and 360 had neither problem. Since the number of persons involved is large, we can consider the

frequencies $\frac{55}{828} = 0.066$, $\frac{381}{828} = 0.460$, $\frac{32}{828} = 0.039$, and $\frac{360}{828} = 0.435$ as

reasonable estimates of the population probabilities. In sampling groups of two persons from this population, any characteristic of the first person can be matched against any of the four possible characteristics of the second person. There are, therefore, 16 possible outcomes to the occurrence of health and social problems in families of two people. The probability of each such outcome is given by the product of the probabilities of the characteristics of the two people. For example, the probability of randomly selecting two people, the first person with a health and a social problem, and the second person with neither problem, is given by $0.066 \times 0.435 = 0.0287$. However, since we do not differentiate between the first and the second person, 0.0287 is also the probability of the outcome in which we select the person with neither problem first, and the one with both problems, second.

By the combining of equivalent outcomes, we obtain the ten outcomes listed in Table A. We then perform the indicated computations to obtain the number of families expected under Hypothesis I for each outcome. We compare the observed and expected frequencies of the different outcomes by means of the X^2 criterion (grouping outcomes No. 5 and No. 10 because of their small expected value). By this method, we get a $X^2 = 38.8$ with 8 degrees of freedom. Under the null hypothesis on repeated random sampling from the indicated population, we would obtain samples more divergent than this one with a frequency of less than one in a thousand. The infrequency of such an event forces us to reject null hypothesis for families of two persons. The same kind of analysis was performed for the other family sizes and the results are presented in Table 5.

In testing Hypothesis II, only a single variable, the presence or

Table A. Frequency distribution of persons with various health and social characteristics in families of two persons.

OUTCOME NUMBER	NUMBER OF PERSONS IN FAMILY WITH BOTH A HEALTH AND A SOCIAL PROBLEM	NUMBER OF PERSONS IN FAMILY WITH A HEALTH PROBLEM ONLY	NUMBER OF PERSONS IN FAMILY WITH A SOCIAL PROBLEM ONLY	NUMBER OF PERSONS IN FAMILY WITH NEITHER PROBLEM	NUMBER OF FAMILIES IN WHICH THIS COMBINATION WAS OBSERVED	NUMBER OF FAMILIES EXPECTED UNDER HYPOTHESIS I
1	0	0	0	2	86	$78.3 = 1 \times 0.435 \times 0.435 \times 414$
2	0	0	1	1	8	$14.0 = 2 \times 0.039 \times 0.435 \times 414$
3	0	1	0	1	159	$165.7 = 2 \times 0.460 \times 0.435 \times 414$
4	1	0	0	1	21	$23.8 = 2 \times 0.066 \times 0.435 \times 414$
5	0	0	2	0	3	$0.6 = 1 \times 0.039 \times 0.039 \times 414$
6	0	1	1	0	16	$14.9 = 2 \times 0.460 \times 0.039 \times 414$
7	1	0	1	0	2	$2.1 = 2 \times 0.066 \times 0.039 \times 414$
8	0	2	0	0	95	$87.6 = 1 \times 0.460 \times 0.460 \times 414$
9	1	1	0	0	16	$25.1 = 2 \times 0.066 \times 0.460 \times 414$
10	2	0	0	0	8	$1.8 = 1 \times 0.066 \times 0.066 \times 414$

absence of health problems, is used. The probability of a health problem among respondents from families of two persons is estimated to be $0.066 + 0.460 = 0.526$. On this basis we can determine how many families we would expect under Hypothesis II in which no one has a health problem, one person has a health problem, or two people have a health problem. To simplify the presentation, the expected number of families with a given outcome is added for families of different size. The actually observed number of families with a given outcome is added in the same fashion, and this procedure yields Table 6. To test Hypothesis III, Table 7 is obtained by treating social problems in the same fashion as was described for health problems. The procedure used in testing Hypothesis IV uses the observed numbers classified under each of the various outcomes in Table 6 and Table 7. The method employed is described in some detail in the text.

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NUMBER OF CHILDREN EXPECTED IN RELATION TO NON-FAMILIAL ACTIVITIES OF THE WIFE¹

JEANNE CLARE RIDLEY²

UNTIL recently the studies in differential fertility have been largely descriptions of variations in fertility among significant groups in the population. More recently the emphasis has been upon the quest for predictively useful social and psychological factors affecting family size. To date only socio-economic factors such as education, occupation, income and religion have proved useful predictors.³ At present however, it is being noted that changes are taking place in the traditionally observed inverse relationship of these socio-economic variables and fertility. These recent findings emphasize the importance of understanding not only the dynamics of this relationship but of discovering other variables that in the future may be more crucial in the prediction of fertility behavior. Thus emphasis has shifted toward the development of more inclusive hypotheses that may lead to a better understanding of fertility differentials.

This paper reports on an attempt to test one of these more inclusive hypotheses as suggested by Ronald Freedman. The general hypothesis is that "fertility differences are related to differences in the division of labor between the family and other social institutions."⁴ This hypothesis is based upon

¹ This is an expanded version of a paper presented at the Southern Sociological Society, Asheville, North Carolina, in April, 1958 and is based upon Clare, Jeanne E.: *The Relationship of Non-Familial Activities to Fertility Behavior*. (Ph.D. dissertation, Department of Sociology, University of Michigan, 1957) (microfilm). The author wishes to express her gratitude to the Survey Research Center of the University of Michigan and the Scripps Foundation for Research in Population Problems for permission to utilize the data from the *Growth of American Families Study*.

² Vanderbilt University.

³ See particularly various articles of Whelpton, P. K. and Kiser, Clyde V. (Editors) *SOCIAL AND PSYCHOLOGICAL FACTORS AFFECTING FERTILITY. Mubank Memorial Fund*, New York, Vol. One, 1946; Vol. Two, 1950; Vol. Three, 1952; Vol. Four, 1954; Vol. Five, 1958.

⁴ This hypothesis has been variously stated by Ronald Freedman in a number of unpublished papers.

Ogburn's "family function" theory of the fertility declines in the West.⁵ Ogburn related the increasing complexity of society with more and more functions centered outside the home to the decrease in family size. Freedman has pointed out that according to this general explanation of fertility declines, the family as a social unit may be understood in terms of its relation to other social units in the society. Thus the extent of the division of labor between the family and other social groups in a society may broadly explain the differentials in fertility behavior.

Following this general approach, one may infer that the degree of involvement of members of a family in other social groups in the society must have a differential impact upon life within the family. The role of the wife in non-familial social systems under present conditions of family organization appears to be crucial in any investigation of family size. Two reasons underlie this assumption, namely: (1) participation in non-familial groups is more highly variable for women than for men, and (2) the mother role is particularly resistant to any expansion of activities outside the family. Not only is the performance of the mother role time consuming but the nature of the role itself is believed to be particularly important.

In the first place, in industrial societies practically all adult men participate in non-familial roles in the pursuit of their occupations. However, the great majority of married women are not in the labor force. While a woman's place is no longer conceived as being solely in the home, work outside the home has not as yet become the general norm, at least for married women. Secondly, the variations of participation in other non-familial systems such as formal organizations appear to be greater for women than for men.⁶

⁵ Ogburn, William F.: *The Family and its Functions*. Chapter XIII, *Recent Social Trends in the United States*, Report of President's Research Committee on Social Trends, 1933.

⁶ Komarovsky, Mirra: *The Voluntary Association of Urban Dwellers*. *American Sociological Review*, December, 1946, XI, pp. 686-698 and Wright, Charles R.: and Hyman, Herbert H.: *Voluntary Association Memberships of American Adults: Evidence* (Continued on page 279)

To appreciate the reasons why the mother role is regarded as incompatible with any expansion of activities outside the home, the role may be viewed first in its historical setting, and then in its modern setting. The role of the woman has been perhaps more deeply affected by the Industrial Revolution than that of the man. In the subsistence economy the woman was part of the economic system. She possibly contributed as much as did her husband to the earning of a livelihood of the family. Her economic role and mother role complemented each other since they both were confined to the home. With the shift of work from the home, woman's economic role tended to disappear and the mother role tended to become predominant.

More recently other factors have contributed to the woman resuming her economic role in society, at least partially. One significant factor has been the increasing life expectancy which has meant that a smaller proportion of the woman's life after marriage is devoted to the child-rearing function. Also, the increased educational and employment opportunities for women and their general "emancipation" have enabled more and more women to spend at least some time in the occupational world before marriage. Thus when a woman enters marriage she is likely to have had a taste of what gainful employment is like and, more important, a feeling of financial independence and responsibility.

Further, the introduction of labor saving devices has been significant in that housekeeping is no longer the time consuming and arduous task that it once was. The amount of time required for "keeping house" is much less for the average woman today than it was for her grandmother, or even her mother. Thus the amount of leisure time available for non-familial activities has increased.

However, the shift of functions away from the family may act in the opposite direction in its effect upon the wife's time.

dence from National Sample Surveys. *American Sociological Review*, June, 1958, XXIII, pp. 284-294.

According to Parsons and Bales, the family has become "a more specialized agency than before."⁷ The family now specializes in what are still vital functions for society, namely "the socialization of children" and "the stabilization of the adult personalities" of the society. The impact of this specialization upon the role of the wife, Parsons and Bales argue, has been great. It has meant that with the shift to the nuclear family from the larger extended family system of preindustrial days, the child-rearing function has shifted more sharply to the wife. There no longer remains the larger extended family upon which she can rely for help. The emphasis of the husband's role in the occupational world has meant that the wife's responsibility for child care has been increased. It is obvious, then, that the requirements of time of the additional roles subtract from the time available for household and child-rearing functions. Two studies support this view.⁸ The first study, by Leevy, has indicated that among rural and urban families in the United States the amount of leisure time varies inversely with the size of family. The second study, by Stoetzel, has indicated that among French urban families the total number of hours per week devoted to household work increased with the number of children.

Even with the large number of labor saving devices in the home the nature of the mother role is not compatible with the expansion of activities outside the home. Child-care cannot easily be compressed into a few hours a day as many household tasks may be. There is a growing emphasis that it is not solely the amount of time that the mother contributes, but rather the type of *mother-child relationship* that is important to the healthy physical and mental development of children. It would seem that the mother's attempt to provide a warm, stable environment for her child is hindered if other

⁷ Parsons, Talcott; and Bales, Robert F.: *FAMILY SOCIALIZATION AND INTER-ACTION PROCESS*. Glencoe, Illinois, The Free Press, 1955.

⁸ Leevy, J. Roy: *Leisure Time of the American Housewife*. *Sociology and Social Research*, November, 1950, xxx, pp. 97-105; and Stoetzel, Jean: *Une Étude Du Budget-Temps de la Femme dans les Agglomérations Urbaines*. *Population*, 1948, No. 1, pp. 47-62.

constant demands are made upon her time and energy. Thus, it would seem that participation in activities outside the home by the woman would tend to necessitate a fairly small family.

In fact census data for the United States and Western European countries have long indicated that among married women an inverse relationship exists between labor force participation and family size.⁹ All these analyses tend to have one common limitation. Although all of them point to an inverse relationship between size of family and labor force participation, it is impossible to come to any conclusion as to the direction of causality. In the first place, it is difficult to decide whether the high incidence of childlessness is due to the tendency for wives to work if they cannot bear children or to the deliberate avoidance of having children by wives who prefer to work. Nor, likewise, is it possible to decide whether families are smaller because wives desire to be employed or whether they are employed because their families are smaller. Doubtless the cause-effect relationships run in both directions.

However, one study by Lois V. Pratt based upon data collected in the STUDY OF SOCIAL AND PSYCHOLOGICAL FACTORS AFFECTING FERTILITY indicated that even for wives whose ability to bear children could not be seriously questioned (i.e. fecund) the relationship between working and family size was observed.¹⁰ Further, her study dealt not only with the participation of wives in the labor force but with their participation in formal organizations and thus offered a more extensive test

⁹ For a summary of data bearing on this point see United Nations, Department of Social Affairs, Population Division, *THE DETERMINANTS AND CONSEQUENCES OF POPULATION TRENDS*, *Population Studies*, No. 17 (ST/SOA/Ser. A 17) New York, 1953, pp. 88-89. Also pertinent is the discussion of this relationship in Myrdal, Alva and Klein, Viola: *WOMEN'S TWO ROLES*. London, Routledge and Kegan Paul Ltd., 1956, pp. 118-120.

¹⁰ Pratt, Lois V.: *The Relationship of Non-Familial Activity of Wives to Some Aspects of Family Life*. Ph.D. dissertation, Department of Sociology, University of Michigan, 1955, (microfilm). Some of the results of this study are found in

Pratt, Lois and Whelpton, P. K.: *Social and Psychological Factors Affecting Fertility*. xxx. *Extra-Familial Participation of Wives in Relation to Interest in and Liking for Children, Fertility Planning and Actual and Desired Family Size*. A paper in Whelpton, P. K. and Kiser, C. V. (Editors): *SOCIAL AND PSYCHOLOGICAL FACTORS AFFECTING FERTILITY*. Vol. Five, 1958, pp. 1245-1280.

of the non-familial hypothesis. In addition, she was able to utilize data on desired family size as well as actual family size. Generally she found an inverse relationship between the extent of nonfamilial activities and actual and desired family size. Investigating separately the relationship of work and club membership she found that they bore a different relationship to fertility. The tendency was for working wives to have only one child while wives belonging to clubs tended to have two children.

Even this study does not definitely establish the direction of the relationship. Its major limitation is its ex-post-facto nature inherent in the type of the sample-wives interviewed 12-15 years after marriage and hence nearing the end of their child-bearing period. Thus, even with the measure of desired family size it is not possible to decide whether wives with non-familial activities really desired smaller families than the others or whether the "recalled" desires simply reflected the numbers of children the couples actually had.

It is hoped that the present report on one aspect of this study will overcome to some extent some of the limitations associated with previous analyses. However, the basic problem of establishing the direction of the relationship is not completely overcome.

DATA AND METHOD

The data for this study are drawn from the "Growth of American Families" Study. Interviews of approximately one hour in length were carried out with a cross-section sample of white married women selected by the area probability method. The total sample consisted of 2713 wives, 18 to 39 years of age, with husband present in the home or temporarily away in military service.¹¹ This study is confined to the 1794 wives classified as fecund.¹² Thus it rules out the possibility in the

¹¹ For a detailed description of the sampling methods see Freedman, R.; Whelpton, P. K. and Campbell, A. A.: *FAMILY PLANNING, STERILITY, AND POPULATION GROWTH*. New York, McGraw Hill Book Co., 1959.

¹² Wives were classified into five fecundity categories as follows: Definitely
(Continued on page 283)

analysis that a relationship between non-familial activities and small size of family is due to group differences in subfecundity. Furthermore, some of the deficiencies of the Pratt study should be overcome in that the present sample is confined to wives who have not completed their childbearing period.

Theoretically, non-familial activities should include all activities that are clearly not family centered. Furthermore, an all inclusive measure should be based upon such data as a complete history of non-familial activities of wives since marriage and a complete accounting of time spent in such activities.

The measurement of non-familial activities was limited in this study to two main areas; namely, labor force participation and membership in formal organizations. The particular measure of labor force participation reported on in this paper is "number of years worked since marriage."¹³ This measure of labor force participation was based upon the responses to the following question:

About how many years have you worked altogether, since you were (first) married?

This measure, it should be noted, is somewhat deficient for this sample of wives in that all have not had the opportunity to work the same number of years because of varying marital durations. However, by introducing controls for age and marital duration, this deficiency is overcome to some extent. More important, perhaps, is the fact that this measure does not indicate the periods in a woman's married life that she has worked. The particular period of a woman's married life in relation to the particular stage of family building may be significant to

Sterile, Probably Sterile, Semifecund, Fecundity Indeterminate and Fecund. The Fecund group is essentially a residual group in that they are wives about whom (on the basis of information reported by them) no serious question exists as to their ability to bear children. For a detailed description of the fecundity classification see *Ibid.*

¹³ Not discussed in this paper is the analysis for two other measures of labor force participation: current membership in the labor force and expectation of working in the future. Essentially similar results for these measures were obtained as reported here for number of years worked since marriage. See Clare, *op. cit.*

the full understanding of the relationship of work to family size.

The measure of membership in formal organizations was derived from responses to the following question:

Apart from a church membership, do you belong to any clubs or organizations, for example a charitable or church group, a P.T.A., a women's auxiliary or club, a social club, a sports team, a civic organization, a labor union or any other organizations?

In addition, the following two questions were asked of club members to obtain some measure of the extent of club activity:

Have you attended a meeting of any clubs or organizations in the last three months?

Have you been an officer or active in any other way in the last three months?

The replies to these questions were classified to yield four levels of club activity. They were defined as follows: non-member—does not belong to any clubs; not active—belongs to at least one club but did not attend a meeting and was not active in the last three months; moderately active—belongs to at least one club and either attended or was active in the last three months; very active—belongs to at least one club, attended a meeting in the last three months and has been an officer or active in the last three months. This particular index was constructed as a measure of one aspect of non-familial activity on the grounds that it is the amount of time and the extent of the responsibility accompanying club membership that approaches an adequate measure of non-familial activity.

The dependent variable utilized in this study is "expected number of children." This measure of fertility is based upon a series of questions asked of the wives as to the number of children they expect to have when their family is completed. The particular measure utilized is an estimate of "the most likely expected number" for the analysis of the data in the

"Growth of American Families" Study generally. It is believed that this measure, essentially a medium estimate, is fairly reliable in that it takes into account the woman's fecundity status, past fertility behavior, and attempts to make some correction for indefinite answers that give a range of possibilities.¹⁴

Generally, completed family size has been recognized as the best measure of fertility. However, in testing an hypothesis such as the one under consideration where there are certain implications of a causal relationship, reliance upon completed family size allows only ex-post-facto analysis. The data on expectations utilized in this study allow the analysis of the independent variables, labor force participation and level of club activity prior to the occurrence of the dependent variable, completed family size.

In addition to the above, several variables were introduced as controls. As suggested previously, the type of sample, wives at various stages of their married lives, demanded that controls be introduced for age and marital duration. Important also for an adequate testing of the hypothesis was a consideration of current size of family, i.e. parity. Thus it is recognized that the dependent variable, expected family size, is dependent to some extent on the current size of family. Simply stated, women cannot expect fewer children than they already have. Finally, because of the long-observed relationship between socio-economic status and fertility, an adequate testing of the hypothesis also demanded that socio-economic status be taken into consideration. Thus controls have been introduced for such important variables as wife's education, husband's income, and wife's religion.

FINDINGS

More specifically, the hypothesis under consideration may be stated as follows: "the degree to which the activities of a woman are centered outside the family is inversely related to her expected size of family." For only one measure of non-

¹⁴ For a discussion of the methodology of this estimate and of reasons for believing it is fairly reliable see Freedman, Whelpton and Campbell, *op. cit.*

YEARS WORKED SINCE MARRIAGE	ALL WIVES	AGE OF WIFE			
		18-24	25-29	30-34	35-39
	MEAN EXPECTED NUMBER OF CHILDREN ¹				
Never Worked	3.7	3.3	4.0	3.8	4.1
Less Than 1 Year	3.4	3.3	3.5	3.6	3.7
1-4.9 Years	3.2	3.2	3.2	3.3	3.1
5+ Years	2.6	*	2.7	2.5	2.5
TOTAL	3.4	3.3	3.5	3.4	3.4
	NUMBER OF WIVES				
Never Worked	556	163	151	126	116
Less Than 1 Year	371	161	101	78	31
1-4.9 Years	652	169	220	162	101
5+ Years	188	5	40	75	68
TOTAL ²	1,782	502	518	445	319

* Base less than 15 cases.

¹ Probability of pattern of differences between means is .001.

² Totals exclude 12 cases unknown number of expected children and include 15 cases unknown years worked.

Table 1. Mean expected number of children by age of wife and years worked since marriage.

familial activities, labor force participation, does the hypothesis receive support.

The longer the work experience of wives since marriage, the smaller the size of family these women are likely to expect. For the total sample, wives who have worked five or more years expect on the average approximately one child less than wives who have never worked. (Table 1)¹⁵ Furthermore, this pattern persists for each age group, although for the youngest age

¹⁵ As will become clear in the discussion that follows because of the small range of variation in family size and the fact that in the course of the analysis it was necessary to deal with a number of small subgroups in the sample, many of the observed differences are not statistically significant. The sampling error for these subgroups is correspondingly large. For these reasons more weight has been attached to the direction of the observed differences. In determining whether the observed pattern of differences is significant the binomial test has been relied upon. For each table the probability of obtaining the observed number of differences or numbers of differences even more extreme was computed. The probability for each table is reported in a footnote. The 5 per cent level of significance was chosen. In performing the binomial test the pattern of differences for the total fecund sample was excluded from N. Moreover, all cases of ties also were excluded from N. For a description of the binomial test see Siegel, Sidney: *NONPARAMETRIC STATISTICS FOR THE BEHAVIORAL SCIENCES*. New York, McGraw-Hill Book Company, Inc., 1956, pp. 36-42.

group the differences in family size are negligible. It is possible that for the youngest wives, a majority of whom have been married a short time, expectations are less reliable. For each of the other age groups the difference in expected family size between wives who have worked five or more years and wives who have never worked is over one child on the average and increases to a difference of 1.6 children for the oldest age group.¹⁶

It should be noted that for the total sample we do not find a large variation in expected family size. At the time of interview 85 per cent of the wives had three or fewer children and approximately 78 per cent expected completed families of two to four children. These data tend to support the view that an overall norm of a relatively small to medium size family of two, three or four children exists among all segments of the population under consideration. In light of this the differences in family size observed in Table 1 between wives by length of work experience are extremely striking.¹⁷

It is not possible to account for the relationship between length of time worked and expected size of family by such important variables as duration of marriage, parity, educational attainment, husband's income or wife's religion. It was found that length of work experience is consistently related to lower fertility expectations when the wives were classified by such variables.

As seen in Table 2 when parity is controlled wives at the same stage of building their families tend to expect fewer children if they have had labor force experience. Thus, the smaller expected family size of wives with work experience cannot be

¹⁶ In Table 1 the differences observed in family size for the total sample between each of the work experience groups are well beyond the sampling errors and are statistically significant at the 5 per cent level.

¹⁷ It should be noted that there is every indication that the means of achieving a small family size are known to most American wives. Among the fecund wives 83 per cent have used some method of family limitation and an additional 8 per cent indicated that they intend to use some method in the future. Other analysis carried out giving support to the general hypothesis under consideration indicated that wives with work experience are more likely to be users of contraceptive methods and more effective in their fertility planning. See Clare, *op. cit.* or Freedman, Whelpton and Campbell, *op. cit.* for a summary of the results of this analysis.

accounted for by the sole achievement of smaller families at the time of interview. In Table 3 when marital duration is controlled, the differences in expected size of family by length of work experience are not only in the predicted direction but are somewhat larger than the differences observed in Table 1. Only for women married less than five years is the difference in the expected number of children between women with no work experience and long work experience (i.e., five or more years) less than one child on the average. For all of the other marital duration groups the differences between women with no work experience and those with five or more years working experience are more than one child.

When wife's educational attainment and husband's income respectively are controlled (Tables 4 and 5), the familiar inverse relationship between expected fertility and education or income is found. However, expected size of family is consistently related to length of work experience regardless of educational attainment or husband's income. In fact there appears

Table 2. Mean expected number of children by number of children ever born and years worked since marriage.

YEARS WORKED SINCE MARRIAGE	ALL WIVES	NUMBER OF CHILDREN EVER BORN				
		0	1	2	3	4
	MEAN EXPECTED NUMBER OF CHILDREN ¹					
Never Worked	3.7	2.8	2.6	3.0	3.7	6.2
Less Than 1 Year	3.4	3.1	3.0	3.1	3.5	5.5
1-4.9 Years	3.2	2.6	2.6	2.9	3.6	5.4
5+ Years	2.6	1.3	1.8	2.3	3.4	5.2
TOTAL	3.4	2.7	2.6	2.9	3.6	5.8
	NUMBER OF WIVES					
Never Worked	556	37	98	190	121	110
Less Than 1 Year	371	80	80	111	57	43
1-4.9 Years	652	78	173	207	111	83
5+ Years	188	20	52	65	29	22
TOTAL ²	1,782	216	404	577	322	263

¹ Probability of pattern of differences between means is .029.

² Totals exclude 12 cases unknown number of expected children and include 15 cases unknown years worked.

Table 3. Mean expected number of children by age of wife, years worked since marriage and duration of marriage.

DURATION OF MARRIAGE AND YEARS WORKED SINCE MARRIAGE	ALL WIVES	AGE OF WIFE			
		18-24	25-29	30-34	35-39
MEAN EXPECTED NUMBER OF CHILDREN ¹					
<i>Married Under 5 Years</i>					
Never Worked	3.3	3.2	3.9	*	*
Worked Less Than 1 Year	3.2	3.3	3.4	*	*
Worked 1-4.9 Years	3.0	3.1	3.0	*	*
<i>Married 5-9 Years</i>					
Never Worked	3.7	3.8	3.8	3.5	*
Worked Less Than 1 Year	3.5	3.4	3.5	3.6	*
Worked 1-4.9 Years	3.2	3.4	3.3	2.9	*
Worked 5+ Years	2.3	*	2.5	2.1	*
<i>Married 10-14 Years</i>					
Never Worked	4.0		4.7	3.9	3.6
Worked Less Than 1 Year	3.9		*	3.8	*
Worked 1-4.9 Years	3.4		3.7	3.6	2.6
Worked 5+ Years	2.7		*	2.7	2.3
<i>Married 15+ Years</i>					
Never Worked	4.6			4.3	4.6
Worked Less Than 1 Year	*			*	*
Worked 1-4.9 Years	3.6			*	3.6
Worked 5+ Years	2.8			*	2.8
TOTAL	3.4	3.3	3.5	3.4	3.4
NUMBER OF WIVES					
<i>Married Under 5 Years</i>					
Never Worked	173	128	31	7	7
Worked Less Than 1 Year	193	141	35	14	3
Worked 1-4.9 Years	214	128	70	11	5
<i>Married 5-9 Years</i>					
Never Worked	182	35	95	45	7
Worked Less Than 1 Year	113	20	60	28	5
Worked 1-4.9 Years	237	41	127	57	12
Worked 5+ Years	60	5	30	21	4
<i>Married 10-14 Years</i>					
Never Worked	123	0	25	59	39
Worked Less Than 1 Year	53	0	6	33	14
Worked 1-4.9 Years	140	0	23	80	37
Worked 5+ Years	70	0	10	40	20
<i>Married 15+ Years</i>					
Never Worked	78	0	0	15	63
Worked Less Than 1 Year	12	0	0	3	9
Worked 1-4.9 Years	61	0	0	14	47
Worked 5+ Years	58	0	0	14	44
TOTAL ²	1,782	500	518	445	319

* Base less than 15 cases.

¹ Probability of pattern of differences between means is .001.

² Totals exclude 12 cases unknown number of expected children and include 15 cases unknown years worked.

Table 4. Mean expected number of children by age of wife, years worked since marriage and wife's education.

WIFE'S EDUCATION AND YEARS WORKED SINCE MARRIAGE	ALL WIVES	AGE OF WIFE			
		18-24	25-29	30-34	35-39
MEAN EXPECTED NUMBER OF CHILDREN ¹					
<i>Grammar School</i>					
Never Worked	4.9	*	4.8	5.2	5.8
Worked Less Than 1 Year	4.3	*	*	*	*
Worked 1-4.9 Years	3.9	*	*	*	3.4
Worked 5+ Years	3.8		*	*	*
<i>High School, 1-3 Years</i>					
Never Worked	3.6	3.3	4.2	3.3	3.7
Worked Less Than 1 Year	3.1	3.1	3.1	2.9	*
Worked 1-4.9 Years	3.4	3.1	3.7	3.4	3.3
Worked 5+ Years	2.7	*	*	2.6	2.2
<i>High School, 4 Years</i>					
Never Worked	3.5	3.5	3.6	3.6	3.3
Worked Less Than 1 Year	3.4	3.2	3.3	3.7	3.8
Worked 1-4.9 Years	3.1	3.1	3.0	3.3	2.9
Worked 5+ Years	2.4	*	2.3	2.5	2.3
<i>College</i>					
Never Worked	3.4	3.1	3.7	3.5	3.4
Worked Less Than 1 Year	3.6	3.6	3.7	3.5	*
Worked 1-4.9 Years	3.1	3.8	2.9	3.0	3.0
Worked 5+ Years	2.2		*	*	2.4
TOTAL	3.4	3.3	3.5	3.4	3.4
NUMBER OF WIVES					
<i>Grammar School</i>					
Never Worked	87	16	20	20	31
Worked Less Than 1 Year	34	10	8	10	6
Worked 1-4.9 Years	53	9	14	13	17
Worked 5+ Years	17	0	2	5	10
<i>High School, 1-3 Years</i>					
Never Worked	157	62	41	35	19
Worked Less Than 1 Year	74	39	17	14	4
Worked 1-4.9 Years	145	44	46	32	23
Worked 5+ Years	49	2	11	21	15
<i>High School, 4 Years</i>					
Never Worked	227	62	67	57	41
Worked Less Than 1 Year	194	86	53	42	13
Worked 1-4.9 Years	335	94	120	81	40
Worked 5+ Years	87	3	20	37	27
<i>College</i>					
Never Worked	85	23	23	14	25
Worked Less Than 1 Year	69	26	23	12	8
Worked 1-4.9 Years	119	22	40	36	21
Worked 5+ Years	35	0	7	12	16
TOTAL ²	1,782	500	518	445	319

* Base less than 15 cases.

¹ Probability of pattern of differences between means is .005.

² Totals exclude 12 cases unknown number of expected children and include 15 cases unknown years worked.

Table 5. Mean expected number of children by age of wife, years worked since marriage and husband's income.

HUSBAND'S INCOME AND YEARS WIFE WORKED SINCE MARRIAGE	ALL WIVES	AGE OF WIFE			
		18-24	25-29	30-34	35-39
		MEAN EXPECTED NUMBER OF CHILDREN ¹			
<i>Under \$3000</i>					
Never Worked	3.9	3.2	4.7	4.0	4.7
Worked Less Than 1 Year	3.6	3.3	•	3.8	•
Worked 1-4.9 Years	3.4	3.3	3.6	3.6	•
Worked 5+ Years	3.2		•	•	•
<i>\$3000-\$3999</i>					
Never Worked	3.7	3.5	3.8	3.6	3.9
Worked Less Than 1 Year	3.4	3.3	3.4	•	•
Worked 1-4.9 Years	3.2	3.1	3.7	3.1	3.0
Worked 5+ Years	2.3			2.2	•
<i>\$4000-\$4999</i>					
Never Worked	3.9	3.2	4.1	3.6	4.9
Worked Less Than 1 Year	3.4	3.3	3.4	3.7	•
Worked 1-4.9 Years	3.2	3.5	2.9	3.4	3.2
Worked 5+ Years	2.6	•	•	3.5	2.7
<i>\$5000+</i>					
Never Worked	3.6	3.4	3.8	3.7	3.3
Worked Less Than 1 Year	3.4	3.0	3.5	3.4	3.6
Worked 1-4.9 Years	2.6	2.8	3.1	3.3	3.2
Worked 5+ Years	2.4	•	•	2.6	1.9
TOTAL	3.4	3.3	3.5	3.4	3.4
NUMBER OF WIVES					
<i>Under \$3000</i>					
Never Worked	128	59	22	22	25
Worked Less Than 1 Year	99	67	13	15	4
Worked 1-4.9 Years	123	58	28	29	8
Worked 5+ Years	29	0	10	8	11
<i>\$3000-\$3999</i>					
Never Worked	120	37	47	20	16
Worked Less Than 1 Year	92	44	28	13	7
Worked 1-4.9 Years	160	54	54	26	6
Worked 5+ Years	40	0	10	20	26
<i>\$4000-\$4999</i>					
Never Worked	116	30	31	33	9
Worked Less Than 1 Year	75	24	25	22	22
Worked 1-4.9 Years	139	29	62	30	4
Worked 5+ Years	51	2	5	21	18
<i>\$5000+</i>					
Never Worked	169	29	44	46	50
Worked Less Than 1 Year	96	22	33	25	16
Worked 1-4.9 Years	206	21	70	64	46
Worked 5+ Years	56	1	13	24	18
TOTAL ²	1,782	500	518	445	319

* Base less than 15 cases.

¹ Probability of pattern of differences between means is .001.

² Totals exclude 12 cases unknown number of expected children and include 14 cases unknown years worked, 68 cases unknown income and 1 case unknown years worked and income.

to be a tendency for differences in expected number of children by education or income to be smaller among women with long work experience than among nonworking wives.

This convergence of family size expectations among wives with work experience is especially notable when religion is controlled (Table 6). The similarity in expected size of family for working wives is particularly evident for the two oldest age groups. Catholic and Protestant wives with 5 or more years of work tend to expect families of approximately the same size.

Table 6. Mean expected number of children by age of wife, years worked since marriage and wife's religion.

WIFE'S RELIGION AND YEARS WORKED SINCE MARRIAGE	ALL WIVES	AGE OF WIFE			
		18-24	25-29	30-34	35-39
MEAN EXPECTED NUMBER OF CHILDREN ¹					
<i>Protestant</i>					
Never Worked	3.5	3.2	3.7	3.5	3.8
Worked Less Than 1 Year	3.2	2.9	3.4	3.4	3.4
Worked 1-4.9 Years	3.1	3.1	3.1	3.2	2.9
Worked 5+ Years	2.5	*	2.6	2.5	2.6
<i>Catholic</i>					
Never Worked	4.4	3.8	4.6	4.5	5.1
Worked Less Than 1 Year	3.9	4.1	3.5	4.1	*
Worked 1-4.9 Years	3.7	3.7	3.6	3.9	3.6
Worked 5+ Years	2.7	*	*	2.5	2.5
TOTAL	3.4	3.3	3.5	3.4	3.4
NUMBER OF WIVES					
<i>Protestant</i>					
Never Worked	377	112	101	83	81
Worked Less Than 1 Year	223	106	57	43	17
Worked 1-4.9 Years	449	127	145	115	62
Worked 5+ Years	132	4	31	56	41
<i>Catholic</i>					
Never Worked	160	45	47	38	30
Worked Less Than 1 Year	134	52	38	31	13
Worked 1-4.9 Years	168	35	62	36	35
Worked 5+ Years	47	1	7	17	22
TOTAL ²	1,782	500	518	445	319

* Base less than 15 cases.

¹ Probability of pattern of differences between means is .002.

² Totals exclude 12 cases unknown number of expected children and include 14 cases unknown years worked, 76 cases "other" religion, 1 case unknown religion and years worked and 1 case unknown religion.

Long work experience tends to eliminate the effect of religious differences for given age groups. For instance, among 30-34 year-old women, we find that both Catholics and Protestants who have worked five or more years expect on the average 2.5 children. Other analysis not reported here indicates that in terms of other measures of fertility behavior such as use of a contraceptive method and effectiveness in use of such methods, Catholic wives with work experience are very similar to Protestant wives who also have had similar work experience.¹⁸ This suggests that the impact of work experience, particularly if it is long, upon Catholic wives results in behavior similar to Protestants with respect to fertility. It may be that work experience results in giving Catholic wives the information and the motivation to restrict their family size. As already pointed out there is a certain incompatibility of the mother role with a role outside the family. These data on expected family size indicate that the mother role is reduced if participation outside the home is extensive.

The preceding analysis points up quite clearly that length of work experience is related to expected size of family. It is not possible on the basis of these data to know whether this relationship is due to the fact that wives want small families in order to be able to work or they want and expect small families for other reasons which nevertheless frees them for work. It would appear though that the consistently smaller expectations of completed family size among wives with work experience reveals a recognition of the incompatibility of the two roles.

While a consideration of work experience as a measure of non-familial activities affords support to the general hypothesis regarding family size, the analysis of data pertaining to wives' club membership does not offer such support, (Table 7). Club members tend to expect about the same size family as non-members—3.3 children on the average as compared with 3.4 children.¹⁹ Only for wives in the oldest age group, 30-34 and

¹⁸ See Clare, *op. cit.*, or Freedman, Whelpton and Campbell, *op. cit.*, for a summary of the results of this analysis.

¹⁹ This difference is well within sampling error and not statistically significant.

CLUB ACTIVITY	ALL WIVES	AGE OF WIFE			
		18-24	25-29	30-34	35-39
Non Member Not Active Moderately Active Very Active TOTAL	MEAN EXPECTED NUMBER OF CHILDREN ¹				
	3.4	3.2	3.5	3.6	3.7
	3.3	3.2	3.3	3.3	3.3
	3.4	3.6	3.5	3.3	3.3
	3.2	3.3	3.4	3.1	3.1
	3.4	3.3	3.5	3.4	3.4
	NUMBER OF WIVES				
	938	362	255	201	120
	168	30	49	60	29
	344	53	124	100	67
330	54	89	84	103	
TOTAL ²	1,782	500	518	445	319

¹ Probability of pattern of differences between means is .500.

² Totals exclude 12 cases unknown number of expected children and include 2 cases unknown club activity.

Table 7. Mean expected number of children by age of wife and club activity.

35-39 years, is there any evidence that club activity is associated with a smaller expected family size. Even among such wives these differences are negligible and they are reduced with the introduction of controls.²⁰

Thus, there exists no consistent relationship between club membership and activity and expected family size. It is believed that any influence club activity may have upon reducing family size is countered by other factors. Club activity for many women is family linked. Women are pulled into many club activities by the fact that they have or have had children. The particular measure relied upon here is believed to be defective in that it does not distinguish between club activities that are family linked and those that are not so linked. In effect, any relationship that may exist between club member-

²⁰ When controls were introduced for length of work experience, parity, marital duration, and socio-economic status there was found little evidence that club membership and activity was associated with a small expected family size. The patterns of differences associated with each of these controls were not statistically significant at the 5 per cent level. These control tables are not shown because of space limitations and the purely negative findings. However, for the interested reader they are available in Clare, *op. cit.*

ship that is clearly non-familial in character and expected family size is obscured by the familial character of many of the clubs these wives belong to. While, as suggested previously, an increase in contacts outside the home may lead to information concerning the means of restricting family size²¹ and the motivation to do so, there exists for club women the counter pressure not to restrict their family size below what is held as the norm for the "average" family. The similarity of expectations of club members and non-club members particularly suggests the presence of an overall norm.

CONCLUSIONS

The purpose of this study was to test the general non-familial hypothesis namely, that "fertility differences are related to differences in the division of labor between the family and other social institutions." In this study the activities of the wife have been focused upon as one important aspect of this division of labor. Two measures, years worked since marriage and club activity, of non-familial activities were utilized. This study, in utilizing data on expected completed family size, has attempted to circumvent some of the limitations of previous studies in this area.

The hypothesis is sustained for the measure of labor force participation but is not for club activity. However, the fact that club activity does not support the hypothesis is not believed to detract from the tentative acceptance of the non-familial hypothesis. In the first place the particular measure of club activity may be defective as a pure measure of non-familial activity and, secondly, the measure of labor force participation is a more extensive measure of non-familial activities.

While on the basis of these data it is not possible to come to any definite conclusion as to the direction of the relationship between non-familial activities and fertility, it is felt that ex-

²¹ Other analysis carried out for two other measures of fertility behavior, use of some contraceptive method and effectiveness in fertility planning indicated that club members were more likely to have used some contraceptive method and to be more effective in their fertility planning than non-members. For these data see Clare, *op. cit.*

pected size of family allows some tentative conclusions. Perhaps most important in this connection is the fact that wives at the same stage of their married life with the same size of family tend to expect smaller completed families if they have worked since marriage. Thus tentatively it would appear that labor force participation has a depressing effect upon family size.

These data suggest that long work experience is associated with low fertility even among groups usually characterized by relatively high fertility. The findings for Catholic wives appear to be particularly significant in this connection. Again, however, it is emphasized the labor force may tend to attract women who do not want large families.

In a population having little variation in family size, differences of one-half to one child on the average are relatively large. When fertility control is being widely practiced in a population and most married couples are attempting to achieve a family of two to four children, the place an individual family occupies in this small range depends upon a large number of factors. These factors are both personal and social and operate through a period of about 20 years of married life and presumably also in the earlier formative years. In dealing with such a complex historical event as the building of a family, it is likely that any individual factor can have only small importance. Thus any factor, such as length of work experience, which maintains consistently a relationship under a variety of significant controls must be considered as important. At the minimum this suggests that if the pattern of increased participation in the labor force continues it is likely that whether a wife works or not will become a more important factor in determining her completed family size.

BIRTH AND DEATH REGISTRATION IN MASSACHUSETTS

III. THE SYSTEM ACHIEVES A FORM, 1849-1869*

ROBERT GUTMAN**

FOR the present paper, I have chosen to limit my discussion of the development of birth and death registration in Massachusetts to the period between 1849 and 1869. In the latter year, a State Board of Health, the first in any American state, was established. Although there were many noteworthy reforms in the operation of the registration system in the towns and cities during these twenty years, which justify a separate discussion of the period, it was notable chiefly for the struggle which took place over the administration of the system by the Secretary of State in Boston. On the one side, there were members of the General Court, who apparently were satisfied to have the system retain its traditional position as an arm of the office of the Secretary. Opposed to them were individuals and groups, primarily physicians, who wished to transfer the responsibility for registration to a government department made up of medical personnel. The inauguration of the Board in 1869 finally resolved this controversy, and the birth and death registration system acquired a form which it retained all through the remainder of the nineteenth century and which it has even today.

BIRTH REGISTRATION, 1849-1869

One of the major defects of vital registration in the towns and cities of Massachusetts in 1849 was the continued under-registration of births. Almost twenty per cent of the births which occurred in the State were overlooked. Underregistration was most pronounced in the medium-sized communities, those of 1,500 to 10,000 inhabitants. These were the settlements with relatively dense and mobile populations, which

* I wish to thank the Population Council, Inc. whose generous support enabled me to conduct the research on which this paper is based.

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unfortunately lacked the resources to conduct a census of births. Very small towns did not change their composition rapidly and the clerks could gather a fairly complete record of their births through hearsay or by making an annual canvass of the residents. In general, the largest towns and the cities had the most complete birth registration. Their officials were likely to have the understanding, the financial resources and the facilities to conduct a regular census of births. Even so, many infants were overlooked in a city such as Boston because often immigrants who had given birth there already were on their way to another community in Massachusetts or to another part of America at the time the canvass was conducted.¹

The problems involved in securing complete and accurate birth information in urban populations were very inadequately understood by the State legislature which framed the existing laws, although this was not true of some of the early students of statistics and statistical systems, such as Lemuel Shattuck. Shattuck realized, at least as early as 1843, that probably the best way to assure full registration would be for physicians and midwives to report to the town clerks all the births which they attended. In view of the large proportion of births that occurred without any professional person in attendance, Shattuck knew that this technique would not be sufficient by itself. But neither was a census alone adequate, and Shattuck saw in the reports of physicians and midwives a procedure that would help to bridge the gaps in the system. His suggestion was ignored, however, even by the committee which he chaired and which reported the proposed bill of 1849.² The plan was ad-

¹ For a discussion of the accuracy of birth registration at this period, see the following sources. Gutman, Robert: *Birth and Death Registration in Massachusetts: II. The Inauguration of a Modern System, 1800-1849*. *Milbank Memorial Fund Quarterly*, October, 1958, xxxvi, No. 4, pp. 399-400. Also, Gutman, Robert: *The Birth Statistics of Massachusetts During the Nineteenth Century*. *Population Studies*, 1956, x, pp. 69-94. Then, Gutman, Robert: *THE ACCURACY OF VITAL STATISTICS IN MASSACHUSETTS, 1842-1901*. Ann Arbor: University of Michigan Microfilm Series, 1956, pp. 114-231.

² Shattuck's first statement of the plan appears in "Letter from Lemuel Shattuck, Esq." in *Massachusetts, Secretary of State: Second Annual Report to the* (Continued on page 299)

vanced again in 1855, by N. A. Appolonio, the City Registrar of Boston, who addressed a petition on the matter to the General Court. Here was the testimony of an expert witness! For six years, Boston had had a relatively efficient census, conducted each January and May by the staff of the *Boston Directory*; yet Appolonio knew that many births, especially the births of immigrants, were overlooked by the canvassers. The General Court appointed a special committee to consider the subject, but they reported unfavorably on his proposal.³

Several factors lay behind the widespread reluctance to require physicians and midwives to report births. Only a short time before, the State government had relinquished the responsibilities of licensing physicians, and some legislators felt that to involve medical practitioners in the registration system again might require a state-sponsored program for distinguishing between competent and less expert physicians and midwives. Physicians themselves objected to the proposal. The Massachusetts Medical Society worried that the government would not set up standards for reporters of births and that its lack of action might be interpreted as approving those practitioners whom the members of the Society regarded as

Legislature . . . Relating to the Registry and Return of Births, Marriage and Deaths. Boston, Dutton and Wentworth, 1843, pp. 64 ff. (In future references to this series of reports, they will be listed as Second Registration Report, Third Registration Report, and so on.)

For the report of the 1849 committee which Shattuck headed, see Massachusetts, LEGISLATIVE DOCUMENTS OF THE HOUSE OF REPRESENTATIVES OF THE GENERAL COURT OF THE COMMONWEALTH, 1849, No. 65, pp. 55-57. (In future references to this series of documents, they will be listed simply as HOUSE DOCUMENTS. The equivalent series for the Senate of the General Court will be listed simply as SENATE DOCUMENTS.)

³ Appolonio's petition and its legislative history are recorded in Massachusetts, *Journal of the House of Representatives of the General Court of the Commonwealth*, 1855, *passim*. (In subsequent references, this source, and the *Journal of the Senate*, will be listed as *House Journal* and *Senate Journal*, respectively.) The condition of the registration system of Boston is discussed in the successive reports of the City Registrar, beginning with the year 1849. These reports are catalogued under Boston: REPORT BY THE CITY REGISTRAR OF THE BIRTHS, MARRIAGES AND DEATHS IN THE CITY OF BOSTON FOR THE YEAR . . . and are included in the collection known as BOSTON CITY DOCUMENTS.

The existing law still provided that parents and householders should register the births of their kin or those which came to their attention, but few people knew of the provision and fewer complied with it. See *Boston Medical and Surgical Journal*, 1868, p. 226.

"quacks." Besides, doctors were reluctant to undertake obligations at the request of the government, particularly duties for the performance of which they would not be paid at all, or for which they would receive, at best, a very small fee. Town and city clerks did not like the idea either. Appolonio had suggested that the towns and cities pay physicians and midwives twenty-five cents for each birth reported. Clerks objected that they, the clerks were paid a smaller sum, only twenty cents, for performing the four tasks of collecting, recording, indexing and returning the record of birth.⁴

In spite of the failure of the State government to reform the law regulating birth registration, a larger proportion of births appear to have been registered in 1860 than in 1850.⁵ A glance through the financial reports of selected communities in Massachusetts indicates that this improvement probably resulted from the fact that more towns, especially towns of 1,500 to 10,000 inhabitants, were conducting censuses of births.⁶ As the population of these communities expanded, the clerks received sufficient income from their other duties so that they could afford to delegate the less remunerative tasks, such as birth recording, to special personnel hired for this purpose.

After the Civil War, the plan advocated first by Shattuck, and then by Appolonio, was adopted for a very brief period. In 1865, the General Court passed a law which did require physicians and midwives to report births and made it the duty of the towns and cities to pay them twenty-five cents for each

⁴ The reasons for the objection to the proposal are taken, partly by direction and partly by inference, from Massachusetts, Secretary of State, INSTRUCTIONS CONCERNING THE REGISTRATION OF BIRTHS, MARRIAGES AND DEATHS IN MASSACHUSETTS, DESIGNED FOR TOWN CLERKS AND PHYSICIANS. Boston, Wright and Potter, 1866; and from editorials and letters in the *Boston Medical and Surgical Journal* for the 1870's dealing with the objections of physicians to the granting of medical certificates of the causes of death; as well as from the history of the registration of physicians described in Fitz, M.D., Reginald H.: *The Rise and Fall of the Licensed Physician in Massachusetts, 1781-1860. Transactions of the American Association of Physicians*, 1894, ix, pp. 1-18.

⁵ Gutman, Robert: *The Birth Statistics of Massachusetts During the Nineteenth Century. loc. cit.*, p. 76.

⁶ The Massachusetts State Library in the State House in Boston has the best collection of financial reports of towns and cities in Massachusetts.

event returned. It is a sad commentary on the state of demographic and statistical science in Massachusetts at the time that the Medical Society and the American Statistical Association took no part in supporting the proposal. It was introduced on the recommendation of the city clerk of Lowell who, like the Registrar of Boston a decade before, believed that the semiannual canvass conducted in his city did not list all the births.⁷

The bill was repealed in 1866, not, however, because it failed to achieve its aim. On the contrary, a study of the reports of individual towns and cities reveals that physicians and midwives returned births in about one-third of the communities in Massachusetts. The law was repealed for the reasons which had interfered with the enactment of similar bills in earlier years, including the opposition of physicians and town and city clerks. In addition, Secretary of State Oliver Warner, the State official most directly concerned with the operation of the registration system, exhibited an ambivalent attitude toward the law. Warner did believe that it would lead to the more complete registration of births over the long-run, especially in the communities of 1,500 to 10,000 inhabitants, where the censuses of births were least effective. But he was disturbed by evidence, such as that given in the returns of Salem, that the law had led some clerks to abandon the census of births. Apparently these clerks believed that the reports of the physicians and midwives would cover all the births which occurred.⁸

By 1870, the underregistration of births had been reduced

⁷ The law is listed as Chapter 96 in *Massachusetts: Acts and Resolves Passed by the General Court in the Year 1865*. Boston, Wright and Potter, 1865. The petition is mentioned in *Massachusetts, House Journal*, 1865, p. 67. A copy of the petition is available along with the manuscript of the law in the files of the Massachusetts State Archives in the State House in Boston.

The complaint that births were missed by the annual census was common as late as 1868. See, *Massachusetts, Twenty-Seventh Registration Report*, p. 6.

⁸ The views of the Secretary of State and others are included in *Massachusetts, Secretary of State: Instructions Concerning the Registration of Births, Marriages and Deaths in Massachusetts, Designed for Town Clerks and Physicians*. Boston, Wright and Potter, 1866, *passim*. The birth returns of Salem are listed in *Massachusetts, Twentieth to Twenty-Seventh Registration Reports* which include the returns for the years between 1861 and 1868.

to below ten per cent.⁹ To some extent, the improvement was the consequence of the more widespread and more efficient use of the censuses of births that began in the previous decade. The achievement of registration completeness during the 1860's also was aided by the increase in the fee paid to town clerks for recording births, an increase from twenty to thirty cents.¹⁰ The law requiring physicians and midwives to report births was a third contributing factor, short-lived as it was. According to the financial reports of the local communities, in a handful of towns in the State, especially small towns, these persons continued to return births even after the bill was repealed, and the town governments paid them for doing it.

DEATH REGISTRATION COMPLETENESS, 1849-1869

The obstacles which stood in the way of reforms in the birth registration law after 1849 did not operate with respect to the death registration system. Clerks in the towns and cities generally welcomed the measures designed to increase the completeness of death returns. Sextons and undertakers, who stood in somewhat the same relation to death registration as did physicians and midwives to the registration of births, did not balk nearly so much at the efforts to include them in the system. Perhaps of even greater importance was the fact that there was less public apathy toward the registration of deaths than there was with regard to births. Not even the professional organizations were much concerned with the trend of fertility; whereas a host of persons and groups, from the Secretary of State to the Massachusetts Medical Society, were intent on improving the completeness of death registration.

About fifteen per cent of the deaths which occurred in Massachusetts in 1850 were not included in the returns received by the office of the Secretary of State in that year. The under-registration was caused almost exclusively by incomplete recording in the individual towns and cities which filed a return.

⁹ Gutman, Robert: *The Birth Statistics of Massachusetts During the Nineteenth Century*, *loc. cit.*, p. 76.

¹⁰ Massachusetts, Twenty-Sixth Registration Report, p. cliii.

The situation thus contrasted with that before 1849, when the principal cause of underregistration was the failure of many town and city clerks to file any information at all with the Secretary.¹¹ There were only ten delinquent towns in 1850; and, by means of repeated admonitions addressed by the Secretary in correspondence to the local governments, all towns and cities came to file returns by 1858.¹²

The absence of full death registration on the local level had several sources. Private farm burials, supervised by the families of the deceased, were still common in this period throughout the rural counties of Massachusetts. The General Court had been advised to outlaw this type of burial in 1850 because of its often unfortunate sanitary consequences, but the legislature refrained from doing so for fear of offending the folk tradition that a farmer should be buried on the land he tilled.¹³ Many such burials were never recorded. Beginning with a law passed in 1855, however, all towns were required to have town burying grounds, supervised by local sextons.¹⁴ And during the Civil War, and in the years immediately following, private cemetery corporations were established in rapidly increasing numbers.¹⁵ So, even though private burial was not outlawed, many fewer such burials took place in the late 1850's and after,

¹¹ See Gutman, Robert: *Birth and Death Registration in Massachusetts: II. The Inauguration of A Modern System, 1840-1849. loc. cit.*, p. 393.

¹² Massachusetts, Seventeenth Registration Report. The activities of the successive incumbents of the office of Secretary of State in behalf of improving the returns is described in the prefaces they wrote to the Registration Reports. All towns continued making returns after 1858 until 1869, when Charlton, a town of about 2,000 people in Worcester County, suddenly failed to return births for the year 1868. The Secretary of State thereupon requested the Attorney-General to prosecute the town government, the first instance of such an action since the inauguration of a modern registration system in 1842. See Massachusetts, Twenty-Seventh Registration Report, p. vi.

¹³ Massachusetts: Commissioners on the Sanitary Survey, *REPORT ON A GENERAL PLAN FOR THE PROMOTION OF PUBLIC AND PERSONAL HEALTH*. Boston, Dutton and Wentworth, 1850, p. 186. Also see, Habenstein, Robert and Lammers, William: *THE HISTORY OF AMERICAN FUNERAL DIRECTING*. Milwaukee, Buffin, 1955, pp. 422-428.

¹⁴ Massachusetts: *Supplements to the Revised Statutes of the Commonwealth of Massachusetts*. Boston: Dutton and Wentworth, 1854-1859, 2, pp. 174-176.

¹⁵ The dates of the formation of cemetery committees and the establishment of cemeteries in Massachusetts are usually given in the annual financial reports of the towns and cities.

and therefore probably a smaller number of deaths were overlooked for this reason.

Except in the cities, deaths often were not registered when the body was removed for burial from the town where the death occurred to another community.¹⁶ The clerk in the town where the death took place assumed that it would be recorded in the town to which the body was taken, and *vice versa*. The practice of removing bodies for burial evidently was quite common, as the records of Milton, a town in Middlesex County whose clerks kept careful registers, show (Table 1). The opposite possibility—that there would be duplicate returns because the death would be registered both where it occurred and where the body was buried—did not present a sizable threat to registration accuracy because the returns were checked for precisely this error when they reached the Secretary's office in Boston.¹⁷ Deaths by violence and accidental deaths were often missed, too. It was usual to hold a coroner's inquest in these cases, but the coroner was not obliged by law to make a report of the death to the Secretary of State. A proposal to require

¹⁶ Local ordinances regulating the removal of bodies are listed in the municipal registers and books of charters and ordinances published every few years by the cities and large towns in Massachusetts. The Massachusetts State Library, in the State House, Boston, has an excellent collection of these sources.

¹⁷ It was easy to check the reports for duplicate returns after 1849 because the law enacted in that year required that the returns list both the place of death and the place of interment. According to Amasa Walker, the Secretary of State, many deaths were eliminated for this reason during the preparation of the Eighth Registration Report. The proportion of such duplicate returns to the total returns of death must, however, have been very small. Walker lists it as only one of the reasons why returns were omitted from the abstracts in 1849, but he speaks of all of the reasons together as having caused the elimination of "many" returns, not a "large number" or a "great proportion." None of the contemporary documents dealing with registration between 1842 and 1849 mention duplicate returns as a weakness of the existing system. The Secretary of State does not refer to it, nor do the various reports prepared by committees of the General Court, nor does Shattuck, although it was his habit to offer a long list of the defects of the existing system. On the other hand, people were aware of duplicate returns as a possible menace. In his circular letters to the town clerks, the Secretary of State emphasized repeatedly that the returns of deaths, and for that matter, the returns of births and marriages, too, were supposed to list only vital events which took place within the boundaries of the clerk's own community. In view of the fact that the administrators of the system were aware of the danger and yet did not believe the danger had been realized, I am led to conclude that duplicate returns were rare before 1849. For Walker's comments, see Massachusetts: Eighth Registration Report, p. iv. An example of the warning of the Secretary will be found in Massachusetts, Third Registration Report, p. vii.

	TOTAL DEATHS	INTERRED IN MILTON	INTERRED ELSEWHERE	PERSONS DYING ELSEWHERE INTERRED IN MILTON
1859	52	38	14	
1860	51	39	12	
1861	49	28	21	
1862	47	30	17	18
1863	44	30	14	21
1864	60	37	23	19
1865	56	34	22	22
1866	40	14	26	6
1867	43	31	12	17
1868	45	20	25	15
1869	39	15	24	22
1870	36	18	18	9
1871	37	13	24	17
1872	47	16	31	18
1873	41	26	15	72
1874	61	30	31	21
1875	52	25	27	19
1876	38	17	21	29
1877	48	21	27	22
1878	33	17	16	27
1879	64	28	36	33
1880	44	23	21	28
1881	51	24	27	28
1882	64	35	29	22
1883	60	29	31	12
1884	62	35	27	26
1885	60	39	21	30
1886	52	24	28	39
1887	63	38	25	28
1888	74	48	26	45
1889	60	27	33	32
1890	69	43	26	49
1891	72	35	37	24
1892	71	40	31	31

SOURCE: Milton, Massachusetts: TOWN REPORTS, 1859/60-1892.

Table 1. Interments of persons dying in Milton, Massachusetts, and deaths occurring elsewhere interred in Milton.

such a report from him was introduced before the General Court in 1855, but failed to carry.¹⁸

Probably the most important source of death underregistra-

¹⁸ On the duties of coroners at this date, see *Massachusetts: REVISED STATUTES OF THE COMMONWEALTH OF MASSACHUSETTS*. Boston, Dutton and Wentworth, 1836, p. 36 and pp. 768-770. For the proposed bill which did not pass, see *Massachusetts: SENATE DOCUMENTS*, 1855, No. 80.

tion after 1849 also had been the cause of difficulties in the preceding decade: the lack of cooperation on the part of sextons and the increasing number of individuals who adopted the undertaking profession. A study of the financial reports of towns and cities for the 1850's indicates that sextons and undertakers reported deaths in only one-half of the communities in the State at this time. This meant that throughout the period discussed in this paper clerks had to resort to the method of recording deaths which had become traditional after 1842, namely, to inquire into deaths at the same time that they made the annual or semi-annual canvass of births. Clerks also sought out sextons and undertakers and examined the death records kept by medical practitioners.¹⁹ In spite of the poor performance of sextons and undertakers, it is worth noting that their cooperation was superior during the 1850's to what it had been between 1844 and 1849.²⁰ Their increasing participation was partly the consequence of the licensing of undertakers and the appointment of superintendents of burial grounds in many towns and cities which had taken advantage of the powers granted them by the Board of Health Act of 1849. All the cities which existed in Massachusetts in 1850 had licensed undertakers, and the earliest ordinances passed by the towns which acquired a municipal form of government after 1849, such as Lynn and Taunton, provided for the appointment of undertakers.²¹

There were, in other words, four defects in the system for securing complete death registration after 1849. Private burials were tolerated, the removal of bodies was not regulated except

¹⁹ See Gutman, Robert: *Birth and Death Registration in Massachusetts: II. The Inauguration of A Modern System, 1800-1849*, *loc. cit.*, p. 384.

²⁰ *Ibid.*, pp. 382-383 and 393-394.

²¹ Massachusetts: *ACTS AND RESOLVES . . . 1849*. Boston, Dutton and Wentworth, 1849, chap. 211. Lynn achieved municipal status in April 1850 and licensed undertakers in June of the same year. Lynn, Massachusetts: *MUNICIPAL REGISTER OF THE CITY OF LYNN . . . Lynn, H. J. Butterfield, 1850*. Taunton became a city in 1864. In April of 1867 the Aldermen approved an ordinance to appoint a superintendent of burial grounds. Taunton, Massachusetts: *THE CITY CHARTER, LAWS AND ORDINANCES, RULES AND ORDERS OF THE . . . CITY OF TAUNTON*. Taunton, C. A. Hock and Son, 1870, pp. 98-100.

in the cities, coroners did not have to report violent deaths, and it was still easy for sextons and undertakers to circumvent the requirement to report deaths. In the twenty year period which separated 1849 and the formation of the State Board of Health, little was done to cope with the first three of these problems. The record of the General Court and the Secretary of State was somewhat better with respect to the question of returns by sextons and undertakers. The impetus for change, however, did not come from the office of the Secretary but rather from the Massachusetts Medical Society and the American Statistical Association. This was similar to what happened during the earliest years of the modern registration system. The successive incumbents of the Secretary's office were not unaware of the weaknesses of the system; rather they were already so overburdened with the day-by-day job of supervising registration along with their other duties that they had little time or opportunity to press for revision of the registration law.²² Furthermore—and this point cannot be repeated often enough—although an occasional Secretary of State appreciated the medical and statistical import of vital records, most incumbents still regarded them primarily as legal documents, useful in settling estates or in deciding the claims of paupers. Viewed from this perspective, the operation of the system was quite adequate, except, of course, for those births or deaths which were not recorded at all. And it ought to be remembered, too, that even though the Secretaries may not have initiated the bills for reform of the law, they often lent their support to the proposals, at least to those proposals not designed to totally eliminate their control of registration.

The Medical Society and the Statistical Association stimulated reform by addressing petitions and memoranda to the General Court calling the attention of the legislature to the poor performance of sextons and undertakers and recommending amendments to the statutes. For instance, in 1855, the Medical Society asked that the legislature *require* towns to

²² Massachusetts: SENATE DOCUMENTS, 1855, No. 80, p. 2.

license undertakers, instead of merely giving them the right to do so; and that the licensed undertakers be dismissed from office if they did not return deaths. The Committee on Towns considered the suggestion, and reported a bill in favor of it, but the bill was voted down by the Senate.²³ The same recommendation was made in another petition addressed to the General Court by the Medical Society in 1856, but it failed to pass, too.²⁴ As an alternative method for controlling undertakers, the 1855 petition suggested that town clerks be given the power to initiate proceedings against sextons and undertakers who failed to perform their duty under the existing law, and that the proceeds of any penalty be divided between the town and the clerk himself. This plan, too, was not enacted.²⁵ It was incorporated in the petition the Medical Society sent in 1856, and in petitions addressed to the General Court by the Society and the Statistical Association in 1859, but again bills growing out of these petitions failed to pass.²⁶ Finally, in 1859, a measure designed to cope with the problem of delinquent sextons and undertakers did receive the approval of the General Court. It required that the person supervising an interment register the death *before* burial, and that he obtain a certificate attesting to this fact from the town clerk.²⁷ The idea for such a law had been suggested several times in the 1840's by Shattuck and others. In fact, Boston had adopted the rule in 1822, when it became a city, and other communities did likewise when they became cities during subsequent decades.²⁸ The plan had never

²³ Massachusetts: SENATE DOCUMENTS, 1855, No. 80. Also *Senate Journal*, 1855, pp. 169, 482 and 504.

²⁴ Massachusetts: SENATE DOCUMENTS, 1856, No. 96. Also *Senate Journal*, 1856, *passim*.

²⁵ Massachusetts: SENATE DOCUMENTS, 1855, No. 80. Also *Senate Journal*, 1855, *passim*.

²⁶ Massachusetts, SENATE DOCUMENTS, 1859, No. 111. The legislative history of the bills arising from these petitions is described in the *Senate and House Journals* for 1859.

²⁷ The full text of the law is given in Massachusetts, Eighteenth Registration Report, pp. cxlii-cxliv.

²⁸ See the municipal registers and the books of charters and ordinances of the various cities as well as Boston, Registry Department, *BILLS OF MORTALITY, 1840-1849*, CITY OF BOSTON. Printed for the Registry Department, 1893, pp. xv-xvi.

before received serious consideration in the legislature probably because it was viewed as restricting the right of private burial. And indeed, the full text of the law was more moderate than the description I have given of it would indicate, because it stated that the undertaker was to register the death before burial only *when practicable*.²⁹

One other measure was written into law in 1860 which was intended to cope with the situation confronting the clerks because of the lack of cooperation of undertakers. In many towns, as I have noted above, it was the practice of clerks to fill the gaps of their death records at the same time as they conducted the canvass of births. Many clerks complained, through their representatives in the General Court, and by letter to the Secretary of State, that they were thus put at a disadvantage compared to clerks in towns in which the undertakers reported deaths. According to the existing law, these clerks argued, they could not demand a larger fee from the town governments for recording *and collecting* deaths than clerks who had only to record them. To compensate clerks who already were contributing this additional effort, as well as to stimulate others who should have been doing so, the legislature, at the suggestion of the Secretary of State, raised the fee for recording deaths to twenty cents for the first twenty entries and ten cents for each entry thereafter.³⁰ Six years later, the logic of the provision was extended. A law enacted in 1866 specified that in cases where undertakers and sextons did not make returns as required by law, and clerks were forced to obtain and record the information, the fee was raised to twenty cents for *each* death returned.³¹

None of the new laws or amendments to existing laws seem to have had any direct influence on the completeness of death

²⁹ This qualification to the law was probably motivated, too, by a reluctance to restrict private burials. See the following sources which give a hint of the issues involved in the debate over the precise text of the law: *Massachusetts: House Journal*, 1859, II, *passim*; and *Senate Journal*, 1859, II, *passim*. Also see *Massachusetts: HOUSE DOCUMENTS*, 1859, Extra Session, Nos. 284 and 301.

³⁰ *Massachusetts: Eighteenth Registration Report*, appendix.

³¹ *Massachusetts: Twenty-Fourth Registration Report*, appendix.

registration, at least no influence that was significant enough to reveal itself clearly in the returns made during the years immediately following their enactment. At the same time, it would appear that the completeness of death registration improved continuously between 1849 and 1869, so that by the latter year no more than three or four per cent of the deaths which occurred in Massachusetts failed to be registered.³² This degree of underregistration represented a considerable decline from the level of almost fifteen per cent which prevailed in 1849. The improvement may have been the gradual and cumulative result of the laws passed in the 1850's and 1860's, or it may just as likely have represented the consolidation of the reforms introduced into the death registration system by the law of 1849. In any case, it would seem that the necessity for complete death registration was widely accepted in Massachusetts by the time the State Board of Health was established in 1869 and that the system for recording the full number of deaths was remarkably efficient. When the question of the accuracy and fullness of the cause of death data is considered, or the quality of the Reports dealing with the returns is evaluated, then, as we shall see, successful achievement did not come about nearly so easily nor so quickly.

CAUSES OF DEATH AND THE REGISTRATION REPORTS, 1849-1860

In the period between 1842 and 1849, the major concern of the architects and critics of the Massachusetts birth and death registration system had been to secure complete recording in the towns and cities of the State. To some extent, as the events I have just finished describing show, this concern continued after 1849, but it no longer dominated the discussion regarding registration. When the members of the Massachusetts Medical Society or the American Statistical Association came together, they spent only a brief time arguing about how undertakers could be made to return deaths to town clerks or

³² Gutman, Robert: *THE ACCURACY OF VITAL STATISTICS IN MASSACHUSETTS*, . . . , pp. 180-181, 231 and *passim*.

whether deaths should be registered prior to burial. Instead, they devoted most of their efforts to discussing what could be done to improve both the returns of the causes of death and the Registration Reports which summarized them.³³ When the registration system was set up originally, it was hoped that these problems might solve themselves as local governments became aware of the importance of vital statistics. But with the passage of the 1849 law, it became clear that fairly complete registration of births and deaths in the towns and cities did not necessarily imply accuracy and efficiency in the other features of the system. Indeed, the very progress of the system toward registration completeness heightened the awareness of the continued deficiencies in the raw cause of death data and the Registration Reports.

Six per cent of the deaths returned in 1849 were returned with no cause of death stated. (In Table 2 these deaths are listed under the heading "unknown.") In addition, many deaths were ascribed to such diseases as teething (a frequently assigned cause of death in the case of children), consumption (a favorite category into which one could place any death which was preceded by a gradual wasting away), or old age (sometimes given as the cause of death of children!). At the same time, relatively few deaths were said to have been caused by heart disease, cancer or stillbirth (Table 2). It can be argued, and with good reasons, that heart ailments and cancer were less common during the middle of the nineteenth century than four or five decades later; yet it is unlikely that the death rates from these diseases were as low as the returns indicated. And so far as stillbirths are concerned, undoubtedly the deaths from this cause were proportionately larger around 1850 than

³³ See the following sources: Burrage, Walter L.: *A HISTORY OF THE MASSACHUSETTS MEDICAL SOCIETY*. Boston: privately printed, 1923, pp. 137 ff; *MEDICAL COMMUNICATIONS OF THE MASSACHUSETTS MEDICAL SOCIETY WITH AN APPENDIX CONTAINING THE PROCEEDINGS OF THE SOCIETY*. Boston, printed for the Society, 1839-1849, *passim*. The statement regarding the meetings of the Statistical Association is conjectural, based on the contents of the petitions it addressed to the General Court. The manuscript minutes of the Association meetings for the years 1852 to 1872 could not be found at the present offices of the Association in Washington, D.C., although the minutes for earlier and later years were available.

REPORT	YEARS	CHOLERA INFANTUM	DEBILITY	INFANTILE DISEASES	TEETHING	OLD AGE
First	1841-2					
Second	1842-3					
Third	1843-4	1.1	0.3	8.0	0.4	7.6
Fourth	1844-5	1.3	0.2	5.2	0.4	5.8
Fifth	1845-6	2.8	0.1	13.0	0.3	7.6
Sixth	1846-7	2.1	0.3	6.5	0.6	6.8
Seventh	1847-8	1.5	0.3	1.6	0.6	5.6
Eighth	1849	1.9	0.3	3.2	0.8	5.4
Ninth	1850	1.6	0.4	4.7	0.9	5.2
Tenth	1851	2.0	0.8	4.1	1.0	5.4
Eleventh	1852	2.0	0.5	5.9	1.1	5.9
Twelfth	1853	2.5	0.4	4.6	1.1	5.6
Thirteenth	1854	2.6	0.5	6.5	1.5	5.8
Fourteenth	1855	3.0	0.4	6.3	1.4	5.9
Fifteenth	1856	2.0	2.7	6.6	1.4	5.6
Sixteenth	1857	—	—	—	—	—
Seventeenth	1858	2.9	0.3	6.5	1.3	6.1
Eighteenth	1859	3.4	0.1	6.4	1.1	6.3
Nineteenth	1860	—	—	—	—	—
Twentieth	1861	—	—	—	—	—
Twenty-First	1862	3.6	0.5	6.2	1.4	5.8
Twenty-Second	1863	3.5	0.4	5.7	1.0	5.6
Twenty-Third	1864	3.9	0.3	5.1	0.9	5.6
Twenty-Fourth	1865	4.1	0.5	5.7	1.3	5.8
Twenty-Fifth	1866	4.2	0.5	6.7	1.0	6.5
Twenty-Sixth	1867	4.0	0.4	7.6	1.3	6.8
Twenty-Seventh	1868	5.3	1.4 ^a	1.9 ^a	1.0	5.8
Twenty-Eighth	1869	5.1	1.2	1.7	1.1	5.9
Twenty-Ninth	1870	6.5	1.2	1.9	1.2	6.4
Thirtieth	1871	5.4	1.2	1.9	1.2	6.4

Table 2. Percentage of deaths assigned to specified causes—Massachusetts, excluding Boston, 1843/4-1871 inclusive.

afterward. Perhaps the most disappointing aspect of the cause of death data to knowledgeable persons of the period was that these deficiencies in the returns did not seem to have been alleviated by the 1849 law.

So far as the Registration Reports are concerned, their users complained that they did not present a continuous series of tables which permitted easy comparison of fertility and mortality from one year to the next.³⁴ In one Report, towns which

³⁴ See Massachusetts, SENATE DOCUMENTS, 1852, No. 141. Also see HOUSE DOCUMENTS, 1853, No. 50; SENATE DOCUMENTS, 1855, No. 80; SENATE DOCUMENTS, 1858, No. 46; and SENATE DOCUMENTS, 1859, No. 111.

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AGE	UNKNOWN	HEART DISEASE	PNEUMONIA	CONSUMPTION	CANCER	PERITONITIS	STILLBORN
	16.8						
	12.9						
6	14.2	1.3	4.1	19.8	1.1	—	0.6
8	6.6	1.4	4.0	24.0	1.1	0.13	0.8
6	5.2	1.6	2.6	23.1	1.2	0.05	1.2
8	4.6	1.9	4.6	22.2	1.1	0.06	1.4
6	11.1	2.0	3.8	21.2	1.0	0.01	1.3
4	6.0	1.7	4.0	19.3	0.7	0.04	1.2
2	3.9	2.3	5.0	22.7	1.0	0.04	1.6
4	3.7	2.2	4.8	21.9	1.0	0.03	1.8
9	2.5	2.4	4.4	23.5	1.0	0.02	2.4
6	4.3	2.3	4.4	24.0	1.0	0.08	2.1
8	3.9	2.2	3.9	22.7	1.0	0.04	1.8
9	1.9	2.5	4.4	24.0	1.5	0.04	2.9
6	2.4	2.7	4.7	23.6	1.2	0.01	2.7
	—	—	5.1	—	—	—	—
1	1.4	2.8	5.7	22.3	1.4	0.07	2.9
3	1.3	2.8	5.7	23.0	1.5	0.08	2.5
	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
8	2.7	3.2	5.2	19.6	1.4	0.1	3.4
6	2.1	2.9	6.2	16.7	1.1	0.2	2.3
6	1.9	2.6	6.3	16.4	1.1	0.1	2.1
8	1.8	3.1	5.7	16.8	1.4	0.1	2.2
5	1.6	3.6	6.9	19.4	1.7	0.2	3.3
8	1.1	3.9	6.3	19.5	1.4	0.2	3.8
8	5.6 ^a	3.9	6.4	17.7	1.5	0.1	2.8
9	5.4	3.6	6.5	18.2	1.8	0.1	3.0
4	4.7	3.6	6.5	18.9	1.9	0.2	2.4
4	4.7	3.6	6.9	18.9	1.9	0.2	2.4

SOURCE: Third to Thirtieth Registration Reports inclusive.
^a The rise in the proportion of deaths ascribed to "Debility" and to "Unknown" as well as the decline in the percentage ascribed to "Infantile Diseases" are a result of a new classification introduced into the Registration Reports beginning in 1868. Before this year, the term "Infantile Diseases" included not only the deaths returned as "Premature" or "Infantile" but also those under two years of age from "Debility" and "Unknown" causes. Beginning in 1868, however, deaths, at whatever age, ascribed to "Debility" or "Unknown" are listed as they were returned. After 1868, the category "Unknown" also included deaths previously classified under "tumor," "hemorrhage," and "inflammation." Massachusetts, Twenty-Seventh Registration Report, p. cv.

made returns were listed separately from those which did not, but in a later Report, both groups were represented in a single table. Retrospective tables, comparing the returns of different years, were included in some Reports before 1849, but not in the Eighth Report. The latter omission was particularly distressing, since the Eighth Report was the first to be published under the 1849 law, and it would have been extremely con-

venient to compare at a single glance the results of the new law with those from the previous laws. Persons less familiar with statistical method—and this category, of course, included most of the readers of the Reports—were greatly annoyed with the failure of the Reports to provide more in the way of interpretive guides. Which towns had the most complete returns? To what extent were the cause of death data reliable? Were precipitous changes in the total number of deaths in the State from year to year evidence of improved registration or did they signify spreading epidemics? Many of these questions, which can be answered now looking back on a series of returns for successive years, could often have been answered at the time by the editors of the Reports, but they were not. Readers complained, too, about the general lack of discursive text. The report for 1849 included thirty-six pages of commentary by Dr. Josiah Curtis, a founder of the American Medical Association and United States delegate to the first International Statistical Congress, but the report for 1850 reverted to an older form and included a commentary only four pages in length written by some clerk in the Secretary's office.³⁵

Readers educated in statistics were disturbed by the reliance which the reports placed on certain indices of vital events whose spurious character already had been recognized by competent statisticians in the early nineteenth century. Probably the outstanding example of this defect was the repeated use made of the *average age of decedents* as a measure of the healthfulness of different counties in Massachusetts or of the State as a whole in comparison with other areas of the United States and Europe.³⁶ Another disturbing feature of the tabular portions was that they failed to list the age of decedents by towns. This made it difficult to study the relative healthfulness of different communities, a weakness of the reports which was

³⁵ For a discussion of Curtis' career, see Shryock, R. H.: The Origin and significance of the American Public Health Movement. *Annals of Medical History*, n.s. I (1926), p. 647. Also see Curtis, Josiah: On Registration in the United States of America, and Levi, Leone: Resume of the Statistical Congress at Brussels, *Journal of the Statistical Society of London*, 1854, xvii, pp. 43-44 and 1-14 respectively.

³⁶ Massachusetts, SENATE DOCUMENTS, 1855, No. 80.

noted by the State officials in charge of mental and reform institutions. These officials wished to establish a new hospital and girls' school; they turned to the reports hoping to find some sign of a salubrious environment in which to locate the school, only to discover that the relevant information was lacking in the tables.³⁷ The absence of these data also prohibited the construction of a reliable life table. Deaths by age for the State as a whole were inadequate for this purpose because it was well known that registration was not equally complete in all communities. Before a life table could be constructed—so, at least, went the argument at the time—it was essential that towns with less accurate or less complete registration be eliminated from the computation. Without tables showing deaths by age for each town, it was impossible to recognize which communities these were.³⁸

In trying to cope with the weaknesses of cause of death data and the Registration Reports, the Medical Society and the Statistical Association assigned the major share of blame to the office of the Secretary of State. There were many reasons for this emphasis. In the first place, they felt that reform on the local level was hopeless, because it involved traditions and practices beyond the reach of their influence. The second reason was the obverse of this belief. The Secretary of State was a clearly defined individual, responsive to the wishes of the General Court. If the legislature could be persuaded of the need for changes in his administration of registration, he would have to comply. In the third place, both groups saw, or thought they saw, in the possible reform of the Secretary's conduct of the system, an opening wedge through which to achieve another goal they held jointly, namely, the formation of a State Board of Health. The fourth, and perhaps most important reason, was that the Secretary's administration of the system

³⁷ *Ibid.*, p. 2.

³⁸ Elliott, E. B.: On the Law of Human Mortality That Appears to Obtain in Massachusetts with Tables of Practical Value Deduced Therefrom. PROCEEDINGS OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. Cambridge, Joseph Lovering, 1858, xi, p. 52.

was inefficient, when judged in terms of its contribution to medical and statistical studies. The successive incumbents of the office had made little effort to improve the accuracy of registration once all the towns and cities in the State had begun to file returns of births and deaths. They did not, for instance, try to acquaint the clerks and registrars with a proper classification of the causes of death. Various Secretaries allowed ordinary clerical employees to decide what information should be tabulated for the Annual Reports.

The first evidence of a radical effort to deal with the situation appeared in 1850. During the previous legislative year, around the time the registration law of 1849 was being considered, the General Court appointed a commission, with Shattuck as chairman, to survey the sanitary condition of the State. This was the group which published the famous report, some of whose recommendations bearing on burial practices have been noted earlier. When the report was issued in 1850, it included a bill suggesting the appointment by the Governor of a State Board of Health. The Board, in turn, was to be charged with the duty of selecting a Secretary to superintend and execute its responsibilities including all the duties formerly "imposed upon the Secretary of State relating to the registry and return of births, marriages and deaths."³⁹ The members of the General Court as a whole did not consider the report seriously and the bill was allowed to die.⁴⁰ The idea of a State Board of Health was too new, at least for Americans. Disease was a great mystery, the possibility of preventing disease through social control was not appreciated by laymen, and physicians were held in low repute. No other State had yet

³⁹ Massachusetts: Commissioners on the Sanitary Survey, *REPORT OF A GENERAL PLAN FOR THE PROMOTION OF PUBLIC AND PERSONAL HEALTH*. Boston, Dutton and Wentworth, 1850, p. 309.

⁴⁰ There is more than the usual amount of material published dealing with this bill since the report to which it was appended marked an important advance in the public health movement in the United States. In addition to the report itself, three sources are valuable for understanding the background of the bill. Burrage, *op. cit.*, pp. 139-140; Whipple, George C.: *STATE SANITATION*. Cambridge, Harvard University Press, 1917, I and II, *passim*; and MacDonald, Eleanor J.: *A History of the Massachusetts Department of Public Health*. *The Commonwealth*, 1936, 23, pp. 83 ff.

established a board of health, and Great Britain, the acknowledged leader in such social reforms, had set up a board of health for the first time only two years previously.⁴¹ These facts did not, however, inhibit organized dissatisfaction with the Secretary of State's administration of the registration system. In 1853, the General Court received a petition from Dr. James Jackson on behalf of the Medical Society. The petition requested that the legislature consider "the expediency of establishing a General Board of Health, or failing that, the office of registrar-general."⁴² The latter office would resemble the department which had been created within the British government in 1837, the director of which was charged with the duties of collecting vital statistics and supervising the decennial census.⁴³ A joint special committee of the General Court, with a physician, Dr. Winslow Lewis, as its chairman, was appointed to consider the petition and presented a wholly favorable report with an accompanying bill. With the exception of one significant innovation, this bill, as distinguished from the petition, was in most other respects like the bill proposed in 1850. The exception was a provision which would have required the registrar-general to submit his registration report to a committee of the Massachusetts Medical Society for their consideration before he sent it to the printer. Although this provision had not been recommended by Dr. Jackson's petition, it had been suggested in some of the medical journals as a way of coping with the poor quality of the Registration Reports. Indeed, the law inaugurating the Rhode Island registration system, which was passed in 1853, incorporated a similar provision.⁴⁴ Certain more liberal members of the Whig

⁴¹ See Shryock, Richard H.: *THE DEVELOPMENT OF MODERN MEDICINE*. New York: Alfred Knopf, 1947, Chaps. ix, x and xii, *passim*; and Lewis, R. A.: *EDWIN CHADWICK AND THE PUBLIC HEALTH MOVEMENT, 1832-1854*. London, Longmans, 1952, *passim*.

⁴² Massachusetts, *HOUSE DOCUMENTS*, 1853, No. 50. The legislative history of the bill and petition appear in *House Journal* and *Senate Journal* for the year 1853.

⁴³ See Massachusetts, *FIRST REGISTRATION REPORT*, pp. 38-46.

⁴⁴ Rhode Island, *SECRETARY OF STATE: FIRST ANNUAL REPORT RELATIVE TO THE REGISTRY AND RETURN OF BIRTHS, MARRIAGES AND DEATHS IN THE STATE, 1852-1853*, p. iv.

party, which controlled both the Governorship and the membership of the General Court in these years, were instrumental in having the bill considered, but they could not command a majority in either the House or the Senate, and the bill did not pass.⁴⁵

In this bill, in spite of its having failed, we can perhaps see more clearly than in the recommendation of the Sanitary Commission, the underlying logic of the attempt to eliminate or limit the Secretary's control of registration. If the poor quality of both the returns of the causes of death and the Registration Reports were the fault of the Secretary, the core of the problem, so it was argued, was the staff of ordinary clerks in his department who compiled the returns and also wrote the Reports. Therefore, it was said, the solution lay in transferring control of registration to a physician, or to a person who at least had some experience with medical matters or who was under the supervision of medical personnel—whether or not the State Board of Health was established. This reasoning was revealed even more fully in 1855. In March of that year, N. A. Appolonio, the Registrar of Boston, sent to the General Court his request that physicians and midwives be required to report births. The petition was referred to a joint special committee on the subject, chaired by Dr. Winslow Lewis again. It was typical of the work of the legislature of this year, ruled as it was by the "Know Nothing" party and including an unusually large number of doctors, teachers, and clergymen, that the committee should have ignored Appolonio's request and concentrated instead on more fundamental issues. It proposed a bill which would have reorganized the registration system in the form of a new department devoted exclusively to registration *within* the Secretary of State's department. But the committee was unable to secure the full support of the General Court and this bill, like its predecessors, failed to pass.⁴⁶ Simi-

⁴⁵ Ware, Edith E.: *POLITICAL OPINION IN MASSACHUSETTS DURING CIVIL WAR AND RECONSTRUCTION*. Columbia University Studies in History, Economics and Public Law, LXXIV, No. 2. New York, Columbia University Press, 1917, p. 16.

⁴⁶ See Massachusetts: *HOUSE DOCUMENTS*, 1855, No. 264; and Massachusetts, (Continued on page 319)

lar legislation relating to registration was considered in 1858, when Dr. James Metcalf, a prominent member of the Medical Society who was also a State Senator, introduced petitions from the Society and the American Statistical Association calling for the appointment of a state registrar. The failure of this bill, the realignment of political parties because of the formation of the new Republican party, and the growing obsession over the slavery issue—all these factors did not deter the advocates of a new department, for in 1859, the same two organizations again presented their petitions, but once more the bills growing out of the petitions were not enacted.⁴⁷

None of the four bills introduced before the General Court between 1853 and 1859 linked the reform of registration with the establishment of a State Board of Health. The critics of registration were sufficiently politic to recognize that to do so would guarantee the defeat of their proposals. For several reasons, however, the bills failed in spite of this strategy. In the first place, the proposals seemed to ignore the fact that most people, including the Secretaries of State themselves, still regarded vital records as primarily legal documents, to be treated like other legal documents. This meant that they should be collected, edited and published by the Secretary, whose job it was to assemble the official documents and records sent to Boston by the towns and cities.⁴⁸ In the second place, to put medical personnel in charge of registration would have implied that the State was giving physicians authority over town clerks. Viewed in this way, the proposals of the Medical Society and Statistical Association were clearly unacceptable. In the third

House Journal, 1855, *passim*. The composition of the General Court in 1855 and its political orientation are discussed in Haynes, George H.: *A Know-Nothing Legislature*. *ANNUAL REPORT OF THE AMERICAN HISTORICAL ASSOCIATION FOR THE YEAR* 1896. Washington, Government Printing Office, 1897, pp. 175-187.

⁴⁷ See *Massachusetts: SENATE DOCUMENTS*, 1858, No. 46 and *SENATE DOCUMENTS*, 1859, No. 111. For a discussion of the politics of the General Court in this year, see Ware, *op. cit.*, pp. 19-21. In accounting for the profusion of petitions and bills, it is perhaps important to understand that a new General Court was elected each year during this period.

⁴⁸ The duties of the Secretary are indexed under the heading "Secretary of the Commonwealth" in *Massachusetts: THE GENERAL STATUTES OF THE COMMONWEALTH OF MASSACHUSETTS . . . PASSED DECEMBER 28, 1859*. Boston, Wright and Potter, 1860.

place, the proposals failed because the fiscal problems of the State were severe enough in the 1850's that new departments or other additions to the work of the executive branch of the government could not be afforded. The emphasis of legislative reform, in fact, was all in the opposite direction, toward the reduction of State expenditures. Indeed, for a period of two years, around the time of the Great Panic of 1857, when the General Court commissioned a special audit of the office of the Secretary of State, it looked as if the registration system might be abandoned altogether, or at the least, have some of its operations curtailed.⁴⁹

THE PUBLIC HEALTH MOVEMENT, 1860-1869

For a few years, the clamor for a separate department of vital statistics or for a board of Health which would include the supervision of vital statistics, was stilled. There were two reasons for this hiatus. As a result of the prodding of the professional societies, the Secretaries of State for the period 1856-1859, Francis de Witt and Oliver Warner, took a more active part in making the vital records useful to physicians and statisticians. For instance, in 1857, Warner distributed a booklet of instructions to the town clerks designed to familiarize them with the standard classification of the causes of death adopted by the new professional organization of physicians, the American Medical Association.⁵⁰ The Secretary also wrote to the

⁴⁹ The panic of 1857 is discussed in Bullock, C. J.: *HISTORICAL SKETCH OF THE FINANCES AND FINANCIAL POLICY OF MASSACHUSETTS FROM 1780 TO 1905*. New York, Macmillan, 1907, pp. 51-53. For a note on some of the effects of the panic see Curtis, John G.: *Industry and Transportation (1820-1889)*, in Albert B. Hart, (ed.): *COMMONWEALTH HISTORY OF MASSACHUSETTS*. New York, The States History Co., 1930, iv, p. 431.

The inquiry into the affairs of the Secretary's office as these related to registration are described in the following sources: *Massachusetts: SENATE DOCUMENTS*, 1857, No. 206; *Massachusetts, SENATE DOCUMENTS*, 1858, Nos. 6 and 10; and *Massachusetts, HOUSE DOCUMENTS*, 1858, No. 39.

⁵⁰ *Massachusetts, Secretary of State: INSTRUCTIONS RELATING TO THE REGISTRY AND RETURN OF BIRTHS, MARRIAGES AND DEATHS IN MASSACHUSETTS*. Boston, William White, 1857. The American Medical Association was organized in 1848, following National Medical Conventions held in 1846 and 1847. The classification of diseases grew out of the deliberations of a committee appointed at the Convention of 1846. Of the five members of the committee, two came from Massachusetts: Lemuel Shattuck and Dr. Edward Jarvis. *Proceedings of the National Medical Conventions held in New York, May, 1846 and Philadelphia, May, 1847*, pp. 20-21.

clerks recommending that they make their entries relating to the causes of death as full and detailed as possible, leaving it to the staff in the State House to classify the information in terms of the nosology of diseases.⁵¹ These measures had some of their intended effect. The deaths assigned to the category "unknown" declined, whereas other causes based on approved medical terminology, such as pneumonia, rose in proportion (Table 2). Taking cognizance of the criticisms leveled against the Registration Reports, the Secretary hired Dr. Edward Strong in 1855 to oversee the tabulation of the returns. Dr. Strong was an eminent Boston physician and a member of the Medical Society;⁵² and his training quickly showed itself when, for the first time, the Report for 1855 classified deaths by age and sex for each town and city in Massachusetts.⁵³ During this period, the Secretary also committed his office to the practice of having a competent physician discuss the tables included in the Reports.

The other cause of the temporary lapse in the movement to reorganize the system was a law passed by the General Court in 1859 which was designed to improve the records of the causes of deaths kept by undertakers and clerks. The law required physicians to provide town and city clerks with a certificate of the cause of death, *if the clerk requested them to do so within fifteen days of the death*. It was adopted as part of the revision and recodification of the General Statutes of Massachusetts.⁵⁴ In spite of the general pessimism in the Medical Society and the Statistical Association over the possibility of influencing registration practices on the local level, their members believed the law should have an opportunity to prove itself. Furthermore, the content of the debate over the law made the

⁵¹ Massachusetts: Fourteenth Registration Report, p. vii.

⁵² *Ibid.*, p. vii.

⁵³ It is to this event that we can attribute the construction of the first reliable American life table, that developed by E. B. Elliott for 1855. See, Elliott, E. B.: *op. cit.*, p. 53.

⁵⁴ See Massachusetts: REPORT OF THE COMMISSIONERS ON THE REVISION OF THE STATUTES. Boston, Wright and Potter, 1858, pp. 196-198; and Massachusetts: AMENDMENTS TO THE COMMISSIONERS' REPORT OF THE REVISED STATUTES. Boston, Wright and Potter, 1859, pp. v, xviii and 34.

critics realize that the General Court, while receptive to minor amendments of the sort represented by the legislation of 1859, was not inclined to incorporate in the Revised Statutes major administrative changes in the system.⁵⁵

In 1861, the agitation in behalf of a board of health and vital statistics started up again with the dispatch of a petition to the General Court on behalf of three groups: the Massachusetts Medical Society, the American Statistical Association and the Boston Sanitary Association.⁵⁶ Several events helped to revive activity. The experiment with physicians' certificates seemed to be a failure. The new law had gone into effect in 1860, yet the proportion of deaths for which the cause of death was not stated did not diminish in that year. Nor was there much evidence that those nosological terms which competent practitioners frowned upon using, such as teething or debility, had become less common in the returns as a consequence of the law (Table 2). The Civil War had begun and this event renewed the physicians' fears of epidemics and other sanitary nuisances, and at the same time raised their hopes that the General Court would at last recognize the need for registration reform.⁵⁷ The public health movement was gaining a new degree of acceptance through the formation in different parts of the State of organizations designed to educate laymen and to arouse in them a concern for sanitary problems. Any resident of Boston, for instance, could become a member of the Boston Sanitary Association upon the payment of one dollar annual dues. Meetings were held every second week in the auditorium of the State House at which prominent physicians, sanitarians, and government officials gave talks on health.⁵⁸ Apparently

⁵⁵ The original proposal on which the bill was based is given in Massachusetts: HOUSE DOCUMENTS, 1859, Extra Session, No. 284. The legislative history of the bill can be found in Massachusetts: *House Journal*, 1859, Part II, *passim*.

⁵⁶ See Massachusetts: SENATE DOCUMENTS, 1861, No. 127. Also see Boston Sanitary Association, MEMORIAL OF THE B.S.A. TO THE LEGISLATURE OF MASSACHUSETTS, ASKING FOR THE ESTABLISHMENT OF A BOARD OF HEALTH AND VITAL STATISTICS. Boston, State Printing Office, 1861.

⁵⁷ Shryock, Richard H.: *op. cit.*, p. 235.

⁵⁸ Boston Sanitary Association, CONSTITUTION, OFFICERS AND CIRCULAR. Boston, 1861.

prior to the formation of these organizations, only professional persons were admitted to membership in public health groups.

The petitions of the three groups were considered by a special committee of the General Court. The report of the committee evidenced more serious concern for the subject of vital registration than any legislative committee's deliberations since the Sanitary Commission of 1850 prepared its survey. The report pointed out that because of the great pressure of business in the Secretary's office, "the work [of registration] is not performed or even superintended by the Secretary or by the higher officers in that department. . . ."⁵⁹ "It is delegated," the report went on, "to subordinate agents and clerks who are not endowed, and cannot act, with the authority and intelligence that are needful for the perfect execution of this work."⁶⁰ Pointing to the Registration Reports, the committee noted that they were "prepared under no permanent and uniform plan; the tabulation of the facts, the deductions that have been drawn from them, are not the same through the years. In ten successive reports only about one quarter, seventeen out of sixty-five, of the statements of facts or combination of facts appear in all."⁶¹ The favorable report of the committee was not able to overcome legislative resistance arising out of the heavy expenditures induced by the War, and the bill did not pass.

Several district medical societies in different parts of Massachusetts petitioned the General Court in 1862.⁶² This was a further sign of growing interest in registration matters, as was the fact that for the first time in the history of vital registration in the State, the sentiments of the petitioners received the explicit and public support of the Governor of the State. The incumbent between 1861 and 1865 was the Republican John A. Andrew, noted for his philanthropic interests and, like many members of his party at the time, persuaded of the need for the

⁵⁹ Massachusetts: SENATE DOCUMENTS, 1861, No. 127, p. 2.

⁶⁰ *Ibid.*, p. 2.

⁶¹ *Ibid.*, p. 2.

⁶² See Massachusetts: SENATE DOCUMENTS, 1862, No. 82.

expansion of the State's social service agencies.⁶³ In his opening address to the legislature in 1863, Governor Andrew raised the memorandum sent during the previous year by the Boston Sanitary Association. "It deserves," he declared, "the perusal of every legislator of the Commonwealth for its practical and comprehensive wisdom; and I earnestly hope its views may be thoroughly examined, and its objects approved by the General Court."⁶⁴ The joint special committee appointed by the General Court to consider the petition made a favorable report but again because of the fiscal argument, the bill was not carried. The movement to establish a board of health remained dormant during the remainder of the War. Then in 1866, another attempt was made by the public health organizations and another committee of the legislature was appointed to consider the subject. There is some confusion in the record as to whether the committee made an unfavorable report or whether it instead reported a bill which the General Court then rejected. In any case, it is known the bill did not pass.⁶⁵

The most important condition explaining the success of the bill which established the State Board of Health in 1869 was the support given to it by the Democratic Party in the General Court.⁶⁶ Many Republicans had for a long time believed in the idea, although their party did not include the proposal in their official programs. The Democrats did, and this fact combined with the support of individual Republicans, assured its passage. Other conditions made their contribution, too, including the great prosperity of the post-Civil War period, which diminished the force of any argument that the burden of

⁶³ Pearson, Henry G.: *THE LIFE OF JOHN A. ANDREW*. Boston, Houghton Mifflin, 1905, I, p. 129. For a discussion of the origins of the Republican party and its political orientation, see Binkley, Wilfred E.: *AMERICAN POLITICAL PARTIES: THEIR NATURAL HISTORY*. New York, Alfred Knopf, 1954, chap. IX, *passim*.

⁶⁴ See Massachusetts: *ACTS AND RESOLVES*, . . . 1862. Boston, Wright and Potter, 1862, p. 272.

⁶⁵ See Bowditch, Vincent Y.: *LIFE AND CORRESPONDENCE OF HENRY INGERSOLL BOWDITCH*. Boston, Houghton Mifflin, 1902, II, p. 218. Also see Whipple, *op. cit.*, I, p. 192.

⁶⁶ The text of the law is printed in Massachusetts, *FIRST ANNUAL REPORT OF THE STATE BOARD OF HEALTH*. Boston, Wright and Potter, 1870, pp. 7-8. The details of the legislative history of the bill can be found in Massachusetts, *Senate Journal*, 1869 and Massachusetts, *House Journal*, 1869.

financing the Board would be too expensive for the State to bear; the fact that the bill establishing the Board incorporated a provision requiring it to investigate the effect of alcoholic beverages on health; and an expanding public awareness that disease could be prevented. According to legend, it is the latter condition which accounted for Democratic support. It was said that the wife of the leader of the Democrats, Mrs. Thomas Plunkett, had read a famous article by Dr. Henry Bowditch in which he claimed to have demonstrated the causal connection between a moist, miasmatic environment and the prevalence of consumption. The article, so the story goes, convinced her of the utility of establishing a board to study the environmental sources of disease, and she persuaded her husband to work for its formation.⁶⁷

None of these factors which account for the establishment of the Board had any effect in influencing the General Court to reform the administration of registration; for when the bill setting up the Board was finally passed, it turned out that the registration system was still in control of the department of the Secretary of State. Evidently the reasons the General Court gave in the 1850's and 1860's for not reforming the system still seemed adequate to the legislators, although some of them recognized that the argument based on the expenses such a reform would entail was no longer valid. But in compensation for the loss of this justification, the General Court found another reason for not giving the Board control over registration: The Board of Health, by virtue of the fact that it was a board, possessed only advisory and quasi-judicial powers. To have the Board acquire the power to administer the registration system, it would have had to be given the status of a *department* of government, much like the department of the Secretary of State. This would have meant that the Board would have required a permanent staff, a greater number of employees, and bigger quarters. The General Court was not

⁶⁷ The political factors which contributed to the passage of the law in 1869 are discussed in three sources: Bowditch, *op. cit.*, II, pp. 218-219; Whipple, *op. cit.*, I, p. 192; and MacDonald, *op. cit.*, p. 83.

willing to underwrite an organization of this magnitude for an activity so new as governmental participation in the field of health.

Although the registration system remained administratively independent of the Board of Health, the Board did become the most important single influence on its future development. The members of the Board were granted the authority to make sanitary surveys, including investigations of the causes of morbidity and mortality. Making use of these powers, the Board proceeded to uncover many defects in the operation of registration which had not been recognized previously. Their investigations also helped to give publicity to the often atrocious health conditions in the State, and thus stimulated the layman's awareness of the need for accurate vital statistics. And the fact that the members of the Board constituted the only medical and statistical personnel within the executive branch of the government, led inevitably to the situation in which they, rather than the Secretary of State, were consulted whenever the reform of the registration system became a matter of public concern after 1869.

ANNOTATIONS

PUBLIC HEALTH AND WELFARE. THE CITIZEN'S RESPONSIBILITY¹

IF, as has been said, every institution is but the lengthened shadow of a single man, Homer Folks' shadow has become something more significant than any institution: It is a body of law, state and local, and an enlightened social consciousness among New York's leading citizens as yet unmatched by any other state. The laws deal with tuberculosis control, child health and welfare, mental health, the care of the aged, control of diphtheria and syphilis, public assistance and other aspects of human need. The social consciousness makes possible bipartisan support for prompt action to meet new problems as they arise.

Folks' first interest was in social welfare. As early as 1909, however, he realized that disease is a primary cause of destitution. Consequently, "keep the parents alive" became the objective of his long crusade for child welfare. In his own terms, "The destination of health is universality: of relief, its disappearance."

When I was State Health Commissioner of New York in the early 1930's, Homer Folks was pleased when I told him that not only two Democratic governors but also leaders in the Republican legislature had said he headed the most powerful pressure group in the State—"The Charity Lobby." Characteristically, he did not interpret this as a personal compliment. To him its significance lay in the fact that substantial citizens, to whose views both the Chief Executive and legislators were constrained to listen, had been persuaded in constantly increasing numbers to support the great cause of human advance.

¹ Zimand, Savel, Editor. PUBLIC HEALTH AND WELFARE, THE CITIZEN'S RESPONSIBILITY—Selected Papers of Homer Folks. New York, The Macmillan Company, 1958.

In 1911 Folks wrote an article on "The Prevention of Insanity" for the American Review of Reviews and organized the first State Committee on Mental Hygiene. It was his thesis that if the causes of mental disease are within human control, existing knowledge should be applied, research for new knowledge undertaken and a serious effort made forthwith to control them. (Note the word *forthwith*. Homer Folks was at the opposite end of the spectrum from the timid and the procrastinating.) He identified syphilis, alcohol and toxic infections as obvious physical causes of insanity, dismissing overwork and heredity as direct causes. As we consider the present status of work toward control of mental illness, it would appear that Folks, the Layman, was wiser in his generation than the sons of Hippocrates.

This reviewer agrees with Stanley P. Davies, author of the Foreword, that Folks not only met the challenges of his time but gave the leadership which shaped events. In addition, he anticipated challenges. He had the great capacity of identifying and interpreting them to responsible citizens—laymen as well as physicians and politicians—before the need for action had emerged into public consciousness. This is the technique by which he developed the most adroit and dynamic program which I have seen during the course of a long professional life in statewide health education. It was because of this that he was able for nearly half a century to give intellectual leadership to political leaders.

As edited by his able son-in-law, Savel Zimand, the "Selected Papers of Homer Folks" entitled "Public Health and Welfare, the Citizens' Responsibility" is an excellent and valuable book. Its single flaw—perhaps because of the inherent modesty of the entire clan, inclusive of in-laws—is that the Biographical sketch is just that, doing less than full justice to this great man and his remarkable influence on our age and time.

This book is a must for every member of the APHA. It also should be read by every citizen who gives leadership to any health and welfare program. This is the story of a pioneer. We need the like of Homer Folks for the ventures of today and tomorrow.

THOMAS PARRAN

Reprinted from American Journal of Public Health.

TRENDS IN BIRTH RATES IN THE UNITED STATES
SINCE 1870¹

THIS book contains three chapters. Two of them deal with trends in ratios of young children to population, for whites and Negroes, respectively. The third chapter presents a taxonomic listing of some of the factors that may have contributed to declines in human fertility.

Nearly all of the materials presented in the first two chapters are based on comparisons of geometric averages of decennial census data for the period 1870-1910 with averages for the period 1910-1950. Thus, time trends are not explored in detail. The geometric averages were obtained from the Kuznets-Thomas Study of Population Redistribution and Economic Growth. Brief account is taken of the effect of mortality and migration of population between the birthdate of the children and the date of the census, and of the effect of undercounting of young children in the censuses, but most of the work is with unadjusted data. States are used as units of measurement.

The first chapter gives attention to the influence on declining birth ratios among whites of (a) demographic changes in the age, sex, and nativity composition and (b) economic changes as implied by changes in the distribution of population by urban and rural residence and in the proportion living in large cities. Okun shows that neither (a) nor (b) explains much of the decline in the fertility of whites. He concludes that changes in the reproductive patterns of persons living in fixed environmental settings have been more important causes of decline in birth rates of whites than the effect of urbanization of the population.

The second chapter makes a similar study for Negroes. Unlike the situation among whites, the rural-to-urban shift of population was a significant factor in the decline of birth rates for Negroes.

The third chapter contains a brief review of hypotheses and methods used by others to explain or describe variations in human fertility. For example, the advantages of a longitudinal study over a cross-sectional approach are briefly discussed. A

¹ Okun, Bernard: *TRENDS IN BIRTH RATES IN THE UNITED STATES SINCE 1870*. The Johns Hopkins Press, Baltimore, 1958, 203 + viii pp., \$3.50, paper.

taxonomic list of some of the factors that may have contributed to declines in fertility is based in part on European experience or hypotheses that have no clear relation to American experience, and whose relevancy, accuracy, or importance for the latter is moot. Thus, the famous Bradleigh-Bessant trial in England in 1877 is cited as evidence of a wide spread of knowledge of birth control methods after 1870. (American birth rates declined sharply and steadily at a much earlier time.) The writings of a German author in the 19th century are cited as evidence of "the declining influence of the Catholic Church." The Catholic Church is incorrectly stated to oppose birth control; it actually opposes only certain methods of control.

The book is a valuable reference source for those who wish a competent and scholarly analysis of ratios of young children to population and simple measures of the trend, by States, for the period from 1870 to 1950. In this reviewer's opinion, the most valuable contribution the book makes is the demonstration that the decline in fertility ratios among whites is probably in only a small part a result of urbanization of the population.

WILSON H. GRABILL

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MIGRATION AND ECONOMIC DEVELOPMENT IN RHODE ISLAND¹

THIS monograph is the second of a series of reports on the population of Rhode Island. It was preceded by Mayer's "Economic Development and Population Growth in Rhode Island." It is concerned with the relationship between population fluctuations due to migratory currents and economic developments in Rhode Island.

The authors point out that in the past the subject of migration has received less attention than have fertility and mor-

¹ Mayer, Kurt B., and Goldstein, Sidney: *MIGRATION AND ECONOMIC DEVELOPMENT IN RHODE ISLAND*. Providence, Rhode Island, Brown University Press, 1958, 63 pp. (Paper) \$1.75.

tality. This is explained in part by the limited data available from previous censuses. "The earlier preoccupation of social scientists with fertility and mortality had rested on the tacit assumption that population growth is primarily determined by the long-term development of birth and death rates. The role of migrations had been minimized as a casual, almost extraneous factor . . . migration is a continuous process." (p. 5)

Maintaining that voluntary migration is a result of economic opportunity differentials between two geographic areas, creating push and pull effects, the report gives a brief description of the State's population size and manufacturing industries for the periods 1870-1910 and 1910-1955. The first period, one of rapid economic expansion, reflects the effects of the industrial revolution and the introduction of cotton manufacturing by Rhode Island in the 18th century. This period was marked by rapid population growth, much of which was from migrants.

The latter period discussed was one of decline in Rhode Island's earlier textile manufacturing leadership and of a contracting economy and slowing down of population growth. Due to a limited diversity of industry, the state was particularly vulnerable to southern competition in the cotton industry and competition from other productive areas located closer to their markets. There was some absorption of the labor force by other industries, but stagnation resulted and Rhode Island no longer held the industrial attraction it once did. The war temporarily stimulated industry, but had an adverse effect on population growth, by restricting immigration. During the period from 1910 to 1930, population growth due to migration decreased and finally became a negative factor. The problem of adapting the State's economic structure to the modern competitive situation still persists.

The second part of the report is concerned with characteristics of migrants, i.e. nativity, color, sex and age. There are historical series of data on volume of migration and net migration rates and origin and destination of native migrants.

The factors of sex and age selectivity in migration are indicated, with a fairly consistent trend of attraction for the 15-24 years age group and a negative net migration balance for some of the older age groups in recent years. This trend of domi-

nance of younger migrants in Rhode Island corresponds with the nationwide pattern.

Analysis of the interstate migrations of the natives indicates which States are most actively involved in population interchange with Rhode Island and the "connection between changes in the direction and flow of migration streams to and from Rhode Island and changes in economic opportunities in adjacent and nearby areas." (p. 41)

The major import of the monograph lies in its value as a demonstration of the interrelation of demographic and economic trends and their joint impact on the affairs of a state.

VIVIAN SMALL

BOOKS

In Collaboration with the Milbank Memorial Fund

APPROACHES TO THE PREVENTION OF DISABILITY FROM CHRONIC PSYCHOSES, AND THE OPEN HOSPITAL WITHIN THE COMMUNITY. 1957 Annual Conference of the Milbank Memorial Fund, 1958. 20 pages. \$1.00.

APPROACHES TO PROBLEMS OF HOME PREVENTION IN AGING AND SOCIETY. 1951 Annual Conference of the Milbank Memorial Fund, 1952. 176 pages. \$1.00.

BACKGROUND OF SOCIAL MEDICINE. 1947 Annual Conference of the Milbank Memorial Fund, 1949. 394 pages. \$2.00.

CURRENT RESEARCH IN HUMAN FERTILITY. 1954 Annual Conference of the Milbank Memorial Fund, 1955. 162 pages. \$1.00.

ELEMENTS OF A COMMUNITY MENTAL HEALTH PROGRAM, THE. 1951 Annual Conference of the Milbank Memorial Fund, 1952. 223 pages. \$1.30.

FAMILY HEALTH MAINTENANCE DEMONSTRATION, THE. A CONTINUOUS LONG-TERM INVESTIGATION OF FAMILY HEALTH. Proceedings of a Round Table at the 1951 Annual Conference of the Milbank Memorial Fund, 1952. 275 pages. \$2.00.

INTERRELATIONS BETWEEN THE SOCIAL ENVIRONMENT AND "MENTAL" DISORDERS. 1952 Annual Conference of the Milbank Memorial Fund, 1953. 207 pages. \$1.50.

INTERRELATIONS OF DEMOGRAPHIC, ECONOMIC AND SOCIAL PROBLEMS IN SEVERELY UNDERDEVELOPED AREAS, THE. Proceedings of a Round Table at the 1953 Annual Conference of the Milbank Memorial Fund, 1954. 707 pages. \$1.75.

NATURE AND TRANSMISSION OF THE GENETIC AND CULTURAL CHARACTERISTICS OF HUMAN POPULATIONS, THE. 1956 Annual Conference of the Milbank Memorial Fund, 1957. 226 pages. \$1.00.

NUTRITION IN RELATION TO HEALTH AND DISEASE. 1949 Annual Conference of the Milbank Memorial Fund, 1950. 253 pages. \$1.00.

PLANNING EVALUATIONS OF MENTAL HEALTH PROGRAMS. 1957 Annual Conference of the Milbank Memorial Fund, 1958. 204 pages. \$1.00.

PREPARING FOR COMMUNITY MENTAL HEALTH. 1956 Annual Conference of the Milbank Memorial Fund, 1957. 224 pages. \$2.00.

PROBLEMS AND PROBLEMS OF COMMUNITY MENTAL HEALTH SERVICES. 1951 Annual Conference of the Milbank Memorial Fund, 1952. 242 pages. \$2.75.

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RESEARCH IN PUBLIC HEALTH. 1951 Annual Conference of the Milbank Memorial Fund, 1952. 226 pages. \$1.00.

SELECTED STUDIES ON MIGRATION SINCE WORLD WAR II. 1957 Annual Conference of the Milbank Memorial Fund, 1958. 244 pages. \$1.00.

SOCIAL AND PSYCHOLOGICAL FACTORS AFFECTING FERTILITY. VOLUMES II, III, IV, AND V. New York: Milbank Memorial Fund, 1950. 1951, P. 95, and 1952, P. 100.

TEN YEARS OF RESEARCH IN HUMAN FERTILITY, DEMOGRAPHY AND PHYSIOLOGY. 1947 Annual Conference of the Milbank Memorial Fund, 1957. 254 pages. \$1.00.

TRENDS AND DIFFERENTIALS IN MORTALITY. 1955 Annual Conference of the Milbank Memorial Fund, 1956. 226 pages. \$1.00.